RAILROAD GAZETTE

FRIDAY, MAY 22.

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Contributions.

The Quincy Electric Freight Railroad.

BOSTON, Mass., May 14, 1891.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your favor of April 21, relative to the Quincy Electric Freight Railroad, has been referred to me, as the promotor of the road, for answer.

As you are probably aware, an enormous amount of granite is daily handled in Quincy, Mass. The stone is teamed to various spots in a small locality at a great cost. After leaving the quarry, it is generally taken to the "cutters," which are separate organizations situated near the track of the Old Colony Railroad at Quincy Adams and range in distance anywhere from one-half mile to a mile or more from the quarries. After having passed the cutters' hands, that which has to be polished is again teamed back to the quarries to the polishing shops. This seems an expensive arrangement, but it cannot well be avoided, from the fact that each quarry owns its polishing shop but has no room for a cutting establishment; and even if it had, it would hardly pay the quarry companies to try and compete with cutting companies.

After the stone is polished it is again teamed to Quincy Adams or West Quincy to the freight yards of the Old Colony Railroad, or to Quincy Point, where it is shipped.

Before going further, let us stop here a moment and again review the journeyings in Quincy of one piece of finished granite. First, it travels to the cutting shops; second, back to the polishing shops; and third, to its shipping point. And all this transportation is done in a most expensive and inconvenient manner by horses. Granite is the hardest freight to handle by any methods of transportation, while horses, of all methods, are least suited to the undertaking, and our object is to simplify and cheapen this by the adoption of electricity. We intend to build a road which will take the freight to its different destinations. . . .

We believe this road should be a financial success, since enormous sums are daily paid in Quincy for doing this work, and our figures show a great saving, including interest on the money invested. We know it will be a public benefit to the city of Quincy, for it will spare the roads, which are to-day in deplorable condition, while the money yearly spent on them is sufficient to make the taxes in Quincy higher than they otherwise would be.

The route has been carefully surveyed by Mr. Gilbert Hodges, of Boston, who also surveyed the route of the Fall River Electric Freight Railroad [see the *Railroad Gazette*, March 27, p. 212]. The estimates and electrical studies have been carefully made by Mr. Hollon C. Spaulding, who performed the same work for the freight road at Fall River.

We have applied for a charter, and this has practically been obtained. The capitalization of the road is $300,000, with a right to issue $150,000 worth of bonds. The apparatus used will be Thomson-Houston, while their regular trolley system of 500 volts will be adopted throughout.

PHILIP L. SALTONSTALL.

Cost of Railroads and of Railroad Service in England.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Referring to your comment upon my letter in your issue of Feb. 20, I would explain that I did not intend to convey the idea that English railroads cost more because they have to do more work, for, as a matter of fact, as you point out, the cost is quite irrespective of the working capacity. Unless it be in lighter rails there is, in England, practically no difference observable between a short, branch line on which a small train runs to and fro three or four times daily, and the main line carrying numerous 70-miles-per-hour expresses. There are the same substantial bridges over or under mere country cart-tracks, and all the usual culverts, fences and expensive station buildings out of all proportion to the amount and nature of the traffic. Expensive brick freight sheds are found at many stations where the traffic is almost *nil*, and these, which cannot possibly be paid for by the volume of traffic they serve, must go very far in the way of swamping the returns from the larger towns.

As regards the question of private-truck ownership I do not think so much weight can attach to this as you seem inclined to think. The majority of private owners are collieries, which always send full truck loads of goods, but there is of course the returning of the trucks empty. One may argue that were such trucks the property of the railroad companies they could be returned full of other goods. This is questionable; for in the first place coal trucks are too dirty for much return traffic, and it is pretty certain that return cargo cannot be obtained for such cars, if suitable. What return, for example, could London make for the coal brought from the North? Looked at from one point of view the return of empties might be reduced. The English railroads are small affairs as regards mileage, and if they were under one management trucks could circulate more than they do. Where private-truck ownership is so expensive is in case of small owners of a few trucks only, who perhaps do not send full loads, but the trucks from the coal pits and kindred industries are always filled. . . .

It is rather unfortunate that the question of cost of freight traffic in this country has been so obscured by biased writers. Mr. Dorsey, for example, did not seem to arrive at any conclusion other than that the American engine earned more than the English engine, and was therefore by so much a better machine. Now it is perfectly obvious that no estimate of the mechanical efficiency of the locomotive can be possibly obtained from any consideration of the amount of paying load moved. Such a comparison—if desirable or of value, which I doubt—should take account of total load moved, and as the proportion of paying to dead load is so much less on English lines than on Americans, this would have very materially altered the aspect. Facts, too, are not very likely to be evolved by acrimonious articles such as have recently graced the columns of your contemporaries on opposite sides of the water, and one scarcely cares to take up the points there raised; but one point raised seems to contradict previously accepted ideas. This was the enormous engine power used in America on easy grades to draw certain loads which should have been drawn very much more easily if American rolling stock is really of less resistance than English. The writer raising the point evidently meant to contend that the fault lay largely in the cars, and if so this would go a long way to dispose of the argument that English costs are due partially to faulty vehicles. If, again, the cause can be no better traced to other causes, the answer is as doubtful as ever.

There is a saying that if a country will make a railroad, the railroad will make the country. It seems to me that in respect of freight traffic the railroads of England have never yet attempted to either gain or increase traffic. Rates are prohibitive on thousands of tons of stuff which would otherwise be moved. Farm produce, even in an overcrowded country like this, rots at the farm because of prohibitive carriage, and it would appear that the state of the freight traffic is such as to be large enough to call for expensive facilities to cope with it, and is then staved off just at the point where any increase would be profitable. Personal recollection of a period of 25 or 30 years tells me that whereas at the beginning of that period freight engines and cars were almost exactly as to-day, there has been constant and continuous progress in every department of passenger traffic. Of course, it is just possible that 30 years ago freight traffic had attained to the very pink of perfection, but though this view of the question may be that of railroad managers, outsiders are tempted to think that the tools which did the work so long ago might have been improved.

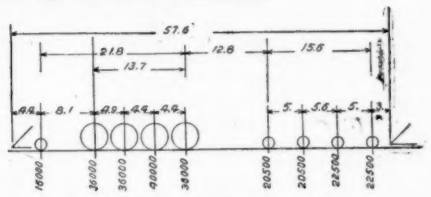
Of the heavy first cost of English railroads, the item of land ought, of course, to have been less; but the cost of of avoiding level crossings is an item which it was not only well to incur, but is an expense which will in the long run have to be faced by American lines as the country fills up. There will be a good deal of killing done first, but it is a charge which will have to be added to bring up the true cost of constructing to a fair comparison with English lines; and when the same sort of supervision is exercised over your railroads as is exercised by the Board of Trade here, a very considerable mileage outlay will be found necessary, and it may turn out that when America is as thickly settled as England the railroads will have cost nearly as much, with the single exception of land cost.

In a comparison of rates, however, there is a point liable to be overlooked in favor of American lines. They do not collect and deliver freight. In England every railroad both collects and delivers the freight it carries. Perhaps, too, in no country are the conditions to be filled so various as in Britain. The capital per mile, for example, varies all the way from $9,000 to upward of $2,500,000; and Mr. Jeans has pointed out that various items of working cost on lines of practically the same calibre and serving the same district are enormously different without palpable cause. Indeed, he seems to indicate that it should be possible to manage each item of expenditure on every line at the cheapest rate attained on any other line. Why, he asks, should locomotive power cost 50 per cent. more on one line than on another not more favorably situated, or another line exceed by 86 per cent. in repairs and renewals, or a third cost 55 per cent. higher per train mile than a fourth in traffic charges? Such differences are greater probably than the difference between American and English averages which cause so much comment, and it would be legitimate to ask English managers to account for them or eliminate them.

W. H. BOOTH.

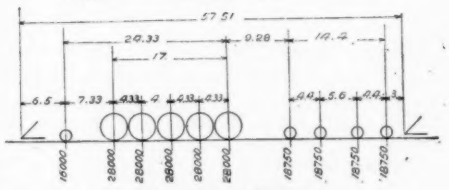
Wheel Weights of Heavy Locomotives.

We give below diagrams showing the distribution of weight of nine very heavy modern locomotives. The data for these documents were gathered by Mr. Kruttschnitt, General Manager Atlantic System, Southern Pacific Co., and are believed to be thoroughly reliable. The diagrams will be of interest and use to a good many of our readers. They are arranged in the order of the total weight on the driving wheels.



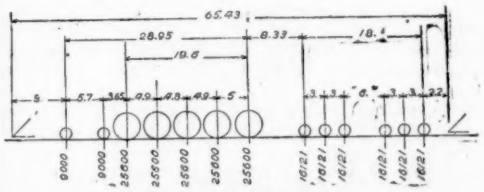
Philadelphia & Reading, Consolidation.

148,000	*lbs. in*	13.7	*ft., or*	10,500	*lbs. per ft.*
164,000	"	21.8	"	7,450	" "
250,000	"	50.2	"	5,000	" "
414,000	"	79.4	"	5,200	" "



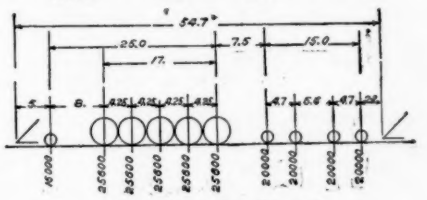
Northern Pacific, Decapod.

140,000	*lbs. in*	17.00	*ft., or*	8,200	*lbs. per ft.*
156,000	"	24.33	"	6,500	" "
231,000	"	48.00	"	4,810	" "
387,000	"	81.84	"	4,700	" "



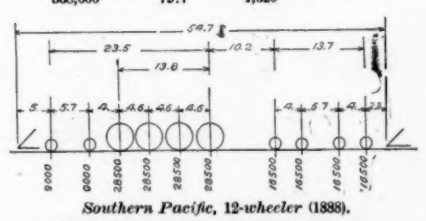
Southern Pacific, El Gobernador.

128,000	*lbs. in*	19.60	*ft., or*	64,000	*lbs. per ft.*
146,000	"	28.95	"	5,000	" "
243 000	"	55.28	"	4,420	" "
389,000	"	94.43	"	4,150	" "



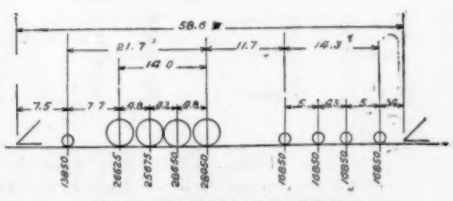
Chesapeake & Ohio, Decapod.

128,000	*lbs. in*	17.0	*ft., or*	7,500	*lbs. per ft.*
144,000	"	25.0	"	5,760	" "
224,060	"	47.5	"	4,720	" "
368,000	"	79.7	"	4,620	" "



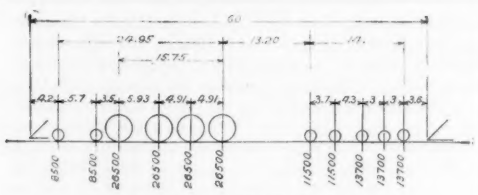
Southern Pacific, 12-wheeler (1888).

114,000	*lbs. in*	13.8	*ft., or*	8,260	*lbs. per ft.*
132,000	"	23.5	"	5,620	" "
194,000	"	46.4	"	4,270	" "
330,000	"	78.2	"	4,220	" "



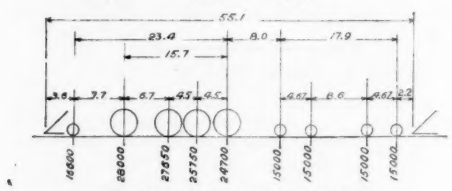
Chesapeake & Ohio, Consolidation.

109,000	*lbs. in*	14.0	*ft., or*	7,790	*lbs. per ft.*
122,850	"	21.7	"	5,700	" "
190,250	"	47.4	"	4,010	" "
313,100	"	80.3	"	3,910	" "



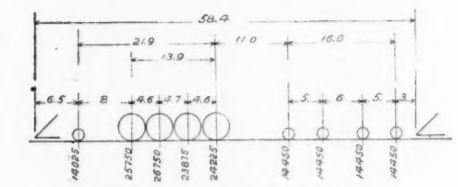
Southern Pacific, 12-wheeler.

106,000 *lbs.*	*in*	15.75 *ft.*,	*or*	6.750 *lbs. per ft.*	
123,000	"	24.95	"	4,950	" "
187,100	"	57.15	"	3,600	" "
310,000	"	84.95	"	3,700	" "



Louisville & Nashville, Consolidation.

106,000 *lbs.*	*in*	15.7 *ft.*,	*or*	6.750 *lbs. per ft.*	
123,000	"	23.4	"	5,350	" "
183,000	"	49.3	"	3,700	" "
306,000	"	78.5	"	3,900	" "



Pennsylvania R. R., Consolidation.

100,600 *lbs.*	*in*	13.9 *ft*,	*or*	7,240 *lbs. per ft.*	
114,625	"	21.9	"	5,210	" "
172,000	"	48.9	"	3,510	" "
287,625	"	80.3	"	2,570	" "

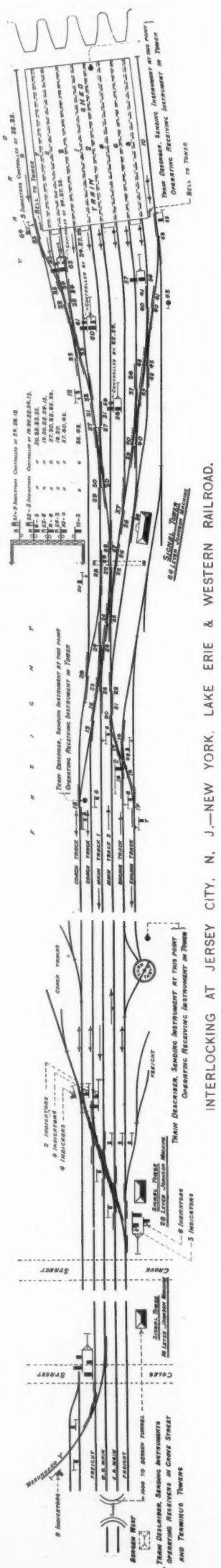
Interlocking at the Erie Terminus, Jersey City.

The diagram printed herewith shows the arrangement of tracks and signals at the passenger terminus of the New York, Lake Erie & Western at Jersey City, N. J., which the Johnson Railroad Signal Co., of Rahway, N. J., has just equipped with interlocking signals. There are three towers, viz., Coles St., Grove St. and the terminus, covering the main line from the Bergen tunnel to the end of the tracks at the Hudson River. The block system of the Eastern division is now in force to the east end of the tunnel, and it is the intention to make use of these new towers in extending it to the terminus by three additional block sections, substituting this system for the automatic block signals heretofore in use here.

The terminus tower was put into service on Sunday, May 3, at 10 a. m. Owing to the great number of train movements made between the hours of 8 and 10 a. m. and from 5 to 7 p. m., the lever men were given three weeks' instruction and practice, and three practice Sundays, working the traffic. There are three shifts of lever men, the two day shifts being each composed of three lever men and one foreman, and the night shift of two lever men and one foreman. All the men were taken from the yard, and had had no previous experience with interlocking. The foreman has a seat in the bay-window, and his duty is to attend to the various audible and visual notices received by wire from the Train Starter, the Yard Master, the Engine Dispatcher, and Bergen West Tower, west of the tunnel. These wire signals are made by "train describers," which will presently be explained. Each describer is capable of 14 indications, all of which are transmitted by two wires and one battery. Grove St. has also one train describer, operated by Bergen West, for trains coming east. All important points are also connected by telephone, for use in cases of emergency. The train describers, telephones and bells are all conveniently located in the bay-window of the tower, within reach of the foreman, who has control of all train movements, the lever men working in accordance with his verbal instructions.

There are eight tracks in the train shed, and the departure of passenger trains from these tracks is governed by semaphore starting signals mounted on continuations of the gate posts at the inner end of the shed. These signals are operated from a tower placed immediately above, which overlooks all the tracks in the shed and is in easy communication with the Station Master's office. On the arrival and discharge of the last boats which are scheduled to connect with a particular train from the up-town and down-town ferries, the boat slips are deposited in the Station Master's office, where they are signed and sent up to the signalman above by means of a small elevator in a tube. On receipt of the slips he notifies the main signal tower, by a train describer, that a train is ready to depart from a certain track. As soon as the acknowledgment is received from the main tower the semaphore at the end of the track is lowered to the clear position, which informs the train conductor that his train must depart. At the same time the gate is closed. The starting semaphores are so located that a conductor looking toward the rear of his train will always see the arm or light exactly in line with the outer edge of the car roofs.

It will be seen that the signal bridge is so placed that the signals thereon govern movements from any track



to any track, in either direction. By the use of selectors, all the bridge signals are operated by eight levers. Without selectors the bridge signals would have required 36 levers. All the appliances are those of the Johnson Railroad Signal Co., and they were put in operation without any trouble through the catching of locking, a difficulty which causes considerable annoyance in bringing into use some large machines.

The train describers are instruments run by clockwork which are set so as to send a variety of preconcerted signals over a signal circuit. The sending instrument has a dial-face with numbered push-buttons fixed around its circumference, each button indicating for a certain track or a certain class of train. By pushing the button the clock-work is made to send a certain number of pulsations over the wire, causing an electromagnet at the other end (receiving station) to move a pointer on a dial (similar to the sending dial) until it stands at the position corresponding to that of the sending button which has been pushed. Signals are answered by a bell, operated over the same wire by making a ground connection (the original indication being carried by metallic circuit). The signalman in the Station Master's office has two describers, one to signal for outgoing trains and one for empty trains backing out. The towerman has one sending instrument to order engines into the train shed, and four receivers, viz., two from the platform, just mentioned, one from Bergen West and one from the making-up yard to notify him when trains are ready to be backed into the shed. At the outer corners of the train shed are circuit closers, by which a bell can be rung in the tower. These are to be used by switching trains coming from the yards, to notify the signalman that they are waiting for signal 55 or 64.

On the first day of opening (Sunday) there was no delay whatever, but when the rush came on Monday morning, the men became somewhat confused, and so delayed a few trains. They caught up with the time-table by 12 o'clock noon. The same thing occurred with the afternoon shift, but these men also caught up with the time-table by 7 P. M. On Tuesday morning there was a remarkable improvement in the speed with which the trains were handled, and no delay whatever took place, but about 2 P. M. a derailment from a broken truck occurred in Bergen tunnel, which completely stopped traffic both ways for three hours. There was naturally a rush when the tunnel was cleared, but the Superintendent says that the train shed was cleared in quicker time than had ever been the case before under similar circumstances.

The frogs and switches were supplied by the Pennsylvania Steel Company.

Rules of Interchange—New England Railroad Club

At the last regular meeting Mr. F. D. Adams presented the report of the Committee on Rules of Interchange. The report was accepted and President Twombly announced that the subject was open for discussion.

The Committee, in introducing their report, say: "After careful study and discussion of the rules, we have come to the conclusion that, as the rules have been very satisfactory to most or all of the roads interested, it is best to make as few changes as possible." The rules were then discussed seriatim, it being agreed that where no change in any rule was suggested by the Committee, and no objection was raised to it by any member present, it should be considered as approved by the club as it now stands.

Rule 3. Section *a*. The committee recommend that the word "diameter" be added after the words "in length or." It was voted that the club recommend that Section *a* of Rule 3 be not changed, but stand as printed in the rules issued in 1890.

The Committee having changed their recommendation in regard to the word "diameter," to the effect that it be inserted in Section *c* instead of Section *a* of Rule 3, there was no opposition on the part of the club.

Section *d* of Rule 3. The Club recommends that it read, "flanges 1 in. thick or less," instead of "flanges less than 1 in. thick."

Mr. Marden moved that there be added to Section *i* the words "if not chipped under." The motion was carried.

Mr. Chamberlain moved that there be added, after the word "car" in the last line but one, of Rule 4, the words "by four tacks"; carried.

Rule 5. The Committee recommend that the words, "or indelible pencil" be stricken out.

Rule 7. The Committee recommend that the words, "before repairs are made" be stricken out.

Rule 11. The Committee recommend that the words "or indelible pencil" be stricken out of Rule 11. No objection was made.

Rule 19. The Committee recommend that there be added to Rule 19 the following: "Provided, however, that when cast or malleable iron is used credit shall be allowed at cast and malleable iron prices." No objection was made to the proposed change.

Rule 20. The Committee recommend that after the words "defect card" in the last full line the following words be inserted: "Which shall state the wrong material used, and." No opposition was made.

Rule 21. The Committee recommend that the first portion of Rule 23, in regard to settlement prices of cars, be changed as follows: That box and stock cars 32 ft. long and over be $300 instead of $272. That box and stock cars under 32 ft. long be $250 instead of $240. That gondola cars, eight-wheeled, 32 ft. long, be $200 instead of $150. That gondola eight-wheeled, under 32 ft. long, be $175 instead of $125. That flat cars, 32 ft. long or over, be $125 instead of $100; under 32 ft. long, $125 instead of $100.

Trucks.—That the word *channel* be stricken out, and the words *steel or* be substituted; and that the price be $275 instead of $250. No opposition was made to these proposed changes.

Rule 24. The Committee recommend that there be added to this rule the following: "Except in case of destruction of private cars, and the company destroying such car elects to return the trucks, it shall deliver said trucks, free of charge to the connecting road, if so required." No opposition was made.

Rule 25. The Committee recommend that the words

"when possible" be placed at the end of the sentence, instead of after "cars" in the preceding line. No opposition was made.

Rule 26. The Committee recommend that after the words "current market prices" there be added the words 'including freight," in the last paragraph but one of Rule 26. No opposition was made to the proposed change.

English Train Accidents.

A brief summary of the Board of Trade report of train accidents in Great Britain and Ireland for 1890 was printed in our last issue, together with condensations of the inspectors' reports on certain accidents that were inquired into. Herewith will be found additional accounts of investigations, omitted last week from lack of space.

At Brindle Heath, on the Lancashire & Yorkshire, Dec. 21, a freight train of 36 cars, running under a so-called "caution" signal through a block section about 3 miles long on a descending grade, was allowed to run too fast, and overran the home signal at the end of the section and fouled a passenger track just as a passenger train came along, producing a violent collision and injuring 25 passengers, of whom one died. The engineman of the freight excuses himself on account of the slippery condition of the rails, but his stories regarding the speed and the efforts he made to alarm the signalman and others when he found his train had eluded his control, are shown to be far from true. The grade was 66 ft. per mile, and the "caution signal" was to the effect that the block section was clear, but that the junction located in the next section was blocked. This sort of signal, "originally intended to be used for the admission of trains to stations where they have to be connected with preceding trains is becoming far too generally used," says Major Marindin. He thinks it would better be not used at all at ordinary junctions; certainly not where they are approached on descending grades. This means that trains should not be allowed to start for a station until the main track through the yard of that station is clear for them. The engineer in this case had not passed examination and his fireman was a green man. As the runner was a steady and experienced fireman, the inspector does not condemn his employment as a runner, but says that such a man should not be sent out without a good fireman. He had been on duty 12¾ hours, which is condemned.

On the London & Northwestern, Oct. 8, at New street, Birmingham, the engine of a passenger train was derailed at a frog as it entered the station at 10 or 12 miles an hour. No serious defect could be found in the engine or track, and Major Marindin attributes the derailment to an engine with a 15-ft. 8-in. rigid wheel base running too fast over a curve of 462 ft. radius. The radius of curve was supposed to have been 528 ft., and the gauge at the frog was ⅛ in. tight. There is no chance to elevate the outer rail, and so it is recommended that the speed be limited by rule to five miles an hour.

At Primrose Hill Tunnel, near Chalk Farm Station, on the London & Northwestern, Nov. 13, at 7:43½ p. m., a passenger train ran into the rear of a freight in the tunnel, making a violent collision and killing the freight conductor. The freight was held by a block signal, and the cause of collision was a failure of block working; one of two freight trains was forgotton in one signal box or the other. "Although in these cases it is hardly ever possible to be absolutely certain which of the two signalmen is at fault," Major Marindin finds the weight of evidence decidedly in favor of the man at the entrance of the section, and he discusses the particulars of booking, etc., at length. He refers to electrical systems of interlocking (such as the Sykes), and says that such a tunnel as this "seems to be a very proper place for the London & Northwestern to adopt such a system." The freight engineer, while waiting, might have whistled, to call the attention of the signalman, but he refrained on account of the rule to whistle as little as possible. The inspector says, however, that it is far more important to follow the rule about whistling when waiting for a signal than to be so careful about annoying people residing near the road. Major Marindin takes occasion to inform the public as to the fallacy involved in assuming that danger would follow if a signalman were to fall asleep at his post; and while recommending the employment of a booking boy at a signal box here, where the man in charge is very busy, expresses the conviction that a second signalman would be a source of danger rather than of safety. These remarks are called out by the verdicts of juries, which appear to be made up in London on the same principles that they are in New York.

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At Broadstone Junction, on the London & Southwestern, Dec. 23, at 5:22 P. M., a lady passenger was killed by a violent collision between a passenger train and a light engine. It appears that the light engine ran past a home signal and onto a track where the passenger train was approaching, and the runner claims that he saw the semaphore light change to green. The inspector does not believe him, however, as it is quite certain that his engine forced open a split switch. The signalman claims that he threw up the signal in the face of the passenger train in time to stop it, but the inspector does not accept the statement. He also made a fatal mistake by going out to flag the careless runner of the light engine instead of throwing all his signals to danger at once, according to rule. But the inspector advises leniency, as the man evidently did what he thought best on the spur of the moment. He did his duty in stopping the engine, although as it turned out, he would better have not done so. All the signaling arrangements at this station were found satisfactory.

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"I am not aware of any practicable mechanical means by which the fact of a wagon having thus been left on the main line could prevent a signalman lowering the signals for that line. It might be possible electrically to prevent a signalman accepting a train under such circumstances by the insulation of one of the rails between (say) the home and advanced signals, and though I fear the conditions are too unfavorable to permit of perfect dependence being placed upon such electrical arrangements, it might be at any rate worth while to give the system a trial."

On the North British Railway, Nov. 11, near Gorgie at about 8 P. M., a passenger train ran into an empty engine which had been waiting at a home signal 22 minutes and had just started when it was struck. This collision was principally due to a failure of block working, and as in the cases at Primrose Hill and elsewhere, there is no conclusive evidence which signalman made the mistake; but the one at the outgoing end of the section frankly states that he will not deny that the other man sent a certain signal to him, although he has not the slightest recollection of it. He was much occupied with freight trains switching and probably forgot to enter the signal on his book. He might have seen the waiting engine and thus have avoided the blunder, but he did not look out along the track. The runner of the light engine disregarded the rule requiring him to send his fireman to the signal-box, and ought to have been "smarter" in starting his engine when the signal was lowered. In point of fact, this signal was pulled off for him before the passenger train got away from the preceding station, and he might, therefore, easily have started and kept ahead of the passenger train. The engineer of the passenger train saw the red tail light of the light engine, but, thinking it was upon a side track, did not slacken his speed. Major Marindin says he had no business to assume that this light was on the siding. The Major also again recommends interlocking of signals (such as the Sykes system), and adds:

"Another way which has been suggested would be by insulating a certain length of rails, as is done in places in America, and providing electrical arrangements which would lock the block instruments or the necessary signals so long as any axle were standing upon the length of rails insulated. This plan has not, however, been sufficiently experimented upon in this country to make it certain whether it is reliable, and if not reliable it would be worse than useless."

(To be Continued.)

Economy Tests of Various Forms of Fire-Boxes.

During the winter of 1888-9 an extended series of tests was made on the Eastern Railway of France to determine the relative economy of deep and shallow fire-boxes, with and without brick arches, water tables, deflectors, hollow stays, etc. The following summary is taken from a detailed account published in the *Revue Générale des Chemins de fer* for February, 1891:

The method followed was to make numerous analyses of gases drawn from the smoke-box during regular trips, the positions of the dampers and deflectors, and the amount of opening of the air passages above the fire being varied for each trip. Engines similar in other respects but with and without brick arches, were also tested. The samples of gas were taken from the smoke-box at a point about opposite the third row of tubes and about 14 inches from the tube sheet were led off through a pipe in the stack, and thence through an aspirator back to the dynamometer car, which was attached directly to the tender. In this car, two modified Orsat sets for gas analysis were placed. From 20 to 24 analyses per hour were made with each apparatus, and, in all, 56 complete tests are recorded, the number of analyses given in the tables averaging about 28 for each test. It was found necessary in order to obtain uniform samples of gas, to turn the end of the pipe in the smoke-box toward the tube sheet, and to protect it from the action of the blast by means of a screen. Also, in taking smoke-box temperatures, the thermometers were similarly protected, or their ends were inserted in the tubes. Without this precaution the temperatures obtained at about 12 in. in front of the tube sheet ranged from 383 degrees Fahr. for the highest to 536 degrees for the lowest thermometer; but when protected, the temperatures indicated by all were sensibly the same, and were found to be from 590 degrees to 608 degrees Fahr. The coal used in most of the tests was bituminous refuse (*menus*), and was thoroughly wet before firing.

The best result given in the table was obtained with a locomotive having a deep fire-box with water table, 18.6 sq. ft. of grate surface, using *briquettes*. In this case 73.4 per cent. of the total heating power of the coal was utilized in making steam. This result is, however, closely approached by that from an express engine having a shallow fire-box with 25.8 sq. ft. of grate surface, and fitted with brick arch and air passages in the front end of the furnace, the efficiency being 72.2 per cent., using fine coal. As a general thing the large shallow fire-boxes with brick arches and open air passages in the front of the fire-box appear to have given the highest efficiency, while the same engine, without the arch and with air passages closed, gave about the poorest results, viz., from 52 to 54 per cent.

The principal deductions of the author from these experiments are briefly as follows:

For locomotives with large grates.—The brick arch is very advantageous for obtaining sensibly complete combustion and greater economy. Air passages in the front of the fire-box above the grate give excellent results whether there is an arch or not. The combustion is notably less economical when the air passages are closed. By opening the air passages a saving of from 5 to 11 per cent. was obtained with certain trains and from 3 to 13 per cent. with others. For the same size of exhaust nozzle, the combustion is the more complete as the air passages are opened wider and as the velocity of the gases in the tubes is less. The deflector gives results comparable with those with air passages, as described, when the locomotive is fitted with an arch.

For locomotives with deep fire-boxes.—The combustion is always excellent with a water-table, whether an arch or a deflector is used or not, but is not always as economical as with locomotives with large grates and with arch and air passages. The tests show that with locomotives having deep fire-boxes there is always a considerable excess of air supplied, regardless of the character of the service. This excess of air supplied, and the consequent loss of heat from the chimney, greatly reduce the advantages gained by complete combustion. The most economical combustion was obtained with an excess of air of about one-fifth.

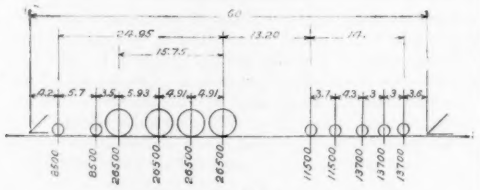
It was found that the combustion was sensibly complete when coal was not drawn through the tubes, but when this occurred the loss was considerable. In the tabulated tests, the combustible drawn through the tubes varied from 1.0 to 11.6 per cent. of the combustible burned, the average for the best ten tests being 4.8 per cent.

The Chicago & Northwestern Lockout.

On May 14 the Chicago & Northwestern paid off its entire force of yard trainmen (switchmen), and as each man received his pay he also received a notice from the general manager reading as follows:

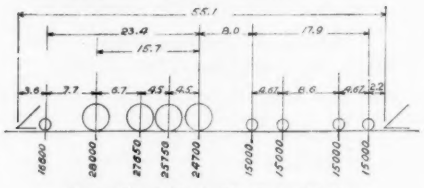
"The switching service of the Chicago & Northwestern Railway Company, as at present performed, is not satisfactory to the public nor to the management of the company. Therefore all yardmasters and switchmen now in the employ of the company are discharged from its service on and after 7 A. M., May 14, 1891. In reorganizing the switching service on this company's lines preference will be given to such men, previously in its employ, as are, in the judgment of the company, capable and worthy.

This summary and somewhat novel proceeding on the part of the road was the direct outcome of a series of strikes on that road by the switchmen, which have proved exasperating to the management and annoying to the public. The switchmen have repeatedly tied up the Chicago terminals on the most trivial pretexts. The last act of this kind occurred on March 23, when the switchmen demanded the discharge of yardmaster Frank McInery for discharging a switchman named Crowe, for refusing to switch certain cars. The switchmen struck at the busiest portion of the day, when the heavy suburban travel was beginning to move home, and rather than inconvenience its patrons the road acceded to the demands of the men, but McInery tendered his resignation, pending investigation, and traffic was resumed. It has since developed that the real cause of the trouble was the fact that McInery was a member of the Brotherhood of Railway Trainmen. The officials at once determined that it was necessary to make a decided stand, and the action taken last week was the result. McInery was reinstated and a force of new switchmen sufficient to move all the passenger traffic and a good part of the freight traffic was quietly secured and put at work under police protection. The plan was most successfully carried through from its inception, and the men were completely nonplussed. The trainmen supported the road and took hold and helped



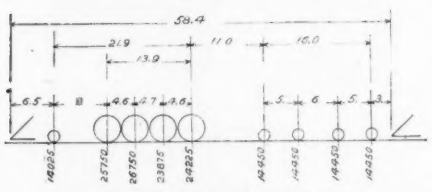
Southern Pacific, 12-wheeler.

106,000	*lbs. in*	15.75	*ft., or*	6,750	*lbs. per ft.*
123,000	"	24.95	"	4,950	" "
187,100	"	52.15	"	3,600	" "
310,000	"	84.95	"	3,700	" "



Louisville & Nashville, Consolidation.

106,000	*lbs. in*	15.7	*ft., or*	6,750	*lbs. per ft.*
123,000	"	23.4	"	5,350	" "
183,000	"	49.3	"	3,700	" "
306,000	"	78.5	"	3,900	" "



Pennsylvania R. R., Consolidation.

100,600	*lbs. in*	13.9	*ft., or*	7,240	*lbs. per ft.*
114,625	"	21.9	"	5,210	" "
172,000	"	48.9	"	3,510	" "
287,625	"	80.3	"	3,570	" "

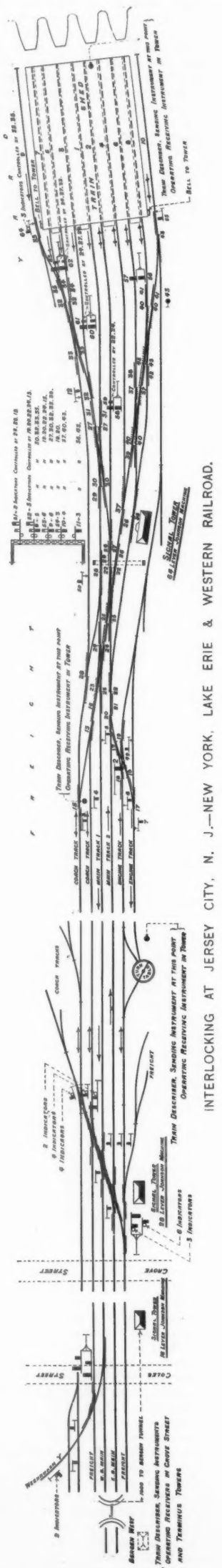
Interlocking at the Erie Terminus, Jersey City.

The diagram printed herewith shows the arrangement of tracks and signals at the passenger terminus of the New York, Lake Erie & Western at Jersey City, N. J., which the Johnson Railroad Signal Co., of Rahway, N. J., has just equipped with interlocking signals. There are three towers, viz., Coles St., Grove St. and the terminus, covering the main line from the Bergen tunnel to the end of the tracks at the Hudson River. The block system of the Eastern division is now in force to the east end of the tunnel, and it is the intention to make use of these new towers in extending it to the terminus by three additional block sections, substituting this system for the automatic block signals heretofore in use here.

The terminus tower was put into service on Sunday, May 3, at 10 a. m. Owing to the great number of train movements made between the hours of 8 and 10 a. m. and from 5 to 7 p. m., the lever men were given three weeks' instruction and practice, and three practice Sundays, working the traffic. There are three shifts of lever men, the two day shifts being each composed of three lever men and one foreman, and the night shift of two lever men and one foreman. All the men were taken from the yard, and had had no previous experience with interlocking. The foreman has a seat in the bay-window, and his duty is to attend to the various audible and visual notices received by wire from the Train Starter, the Yard Master, the Engine Dispatcher, and Bergen West Tower, west of the tunnel. These wire signals are made by "train describers," which will presently be explained. Each describer is capable of 14 indications, all of which are transmitted by two wires and one battery. Grove St. has also one train describer, operated by Bergen West, for trains coming east. All important points are also connected by telephone, for use in cases of emergency. The train describers, telephones and bells are all conveniently located in the bay-window of the tower, within reach of the foreman, who has control of all train movements, the lever men working in accordance with his verbal instructions.

There are eight tracks in the train shed, and the departure of passenger trains from these tracks is governed by semaphore starting signals mounted on continuations of the gate posts at the inner end of the shed. These signals are operated from a tower placed immediately above, which overlooks all the tracks in the shed and is in easy communication with the Station Master's office. On the arrival and discharge of the last boats which are scheduled to connect with a particular train from the up-town and down-town ferries, the boat slips are deposited in the Station Master's office, where they are signed and sent up to the signalman above by means of a small elevator in a tube. On receipt of the slips he notifies the main signal tower, by a train describer, that a train is ready to depart from a certain track. As soon as the acknowledgment is received from the main tower the semaphore at the end of the track is lowered to the clear position, which informs the train conductor that his train must depart. At the same time the gate is closed. The starting semaphores are so located that a conductor looking toward the rear of his train will always see the arm or light exactly in line with the outer edge of the car roofs.

It will be seen that the signal bridge is so placed that the signals thereon govern movements from any track



INTERLOCKING AT JERSEY CITY, N. J.—NEW YORK, LAKE ERIE & WESTERN RAILROAD.

to any track, in either direction. By the use of selectors, all the bridge signals are operated by eight levers. Without selectors the bridge signals would have required 36 levers. All the appliances are those of the Johnson Railroad Signal Co., and they were put in operation without any trouble through the catching of locking, a difficulty which causes considerable annoyance in bringing into use some large machines.

The train describers are instruments run by clock-work which are set so as to send a variety of preconcerted signals over a signal circuit. The sending instrument has a dial-face with numbered push-buttons fixed around its circumference, each button indicating for a certain track or a certain class of train. By pushing the button the clock-work is made to send a certain number of pulsations over the wire, causing an electromagnet at the other end (receiving station) to move a pointer on a dial (similar to the sending dial) until it stands at the position corresponding to that of the sending button which has been pushed. Signals are answered by a bell, operated over the same wire by making a ground connection (the original indication being carried by metallic circuit). The signalman in the Station Master's office has two describers, one to signal for outgoing trains and one for empty trains backing out. The towerman has one sending instrument to order engines into the train shed, and four receivers, viz., two from the platform, just mentioned, one from Bergen West and one from the making-up yard to notify him when trains are ready to be backed into the shed. At the outer corners of the train shed are circuit closers, by which a bell can be rung in the tower. These are to be used by switching trains coming from the yards, to notify the signalman that they are waiting for signal 55 or 64.

On the first day of opening (Sunday) there was no delay whatever, but when the rush came on Monday morning, the men became somewhat confused, and so delayed a few trains. They caught up with the time-table by 12 o'clock noon. The same thing occurred with the afternoon shift, but these men also caught up with the time-table by 7 P. M. On Tuesday morning there was a remarkable improvement in the speed with which the trains were handled, and no delay whatever took place, but about 2 P. M. a derailment from a broken truck occurred in Bergen tunnel, which completely stopped traffic both ways for three hours. There was naturally a rush when the tunnel was cleared, but the Superintendent says that the train shed was cleared in quicker time than had ever been the case before under similar circumstances.

The frogs and switches were supplied by the Pennsylvania Steel Company.

Rules of Interchange—New England Railroad Club

At the last regular meeting Mr. F. D. Adams presented the report of the Committee on Rules of Interchange. The report was accepted and President Twombly announced that the subject was open for discussion.

The Committee, in introducing their report, say: "After careful study and discussion of the rules, we have come to the conclusion that, as the rules have been very satisfactory to most or all of the roads interested, it is best to make as few changes as possible." The rules were then discussed seriatim, it being agreed that where no change in any rule was suggested by the Committee, and no objection was raised to it by any member present, it should be considered as approved by the club as it now stands.

Rule 3, Section *a*. The committee recommend that the word "diameter" be added after the words "in length or." It was voted that the club recommend that Section *a* of Rule 3 be not changed, but stand as printed in the rules issued in 1890.

The Committee having changed their recommendation in regard to the word "diameter," to the effect that it be inserted in Section *c* instead of Section *a* of Rule 3, there was no opposition on the part of the club.

Section *d* of Rule 3. The Club recommends that it read, "flanges 1 in. thick or less," instead of "flanges less than 1 in. thick."

Mr. Marden moved that there be added to Section *i* the words "if not chipped under." The motion was carried.

Mr. Chamberlain moved that there be added, after the word "car" in the last line but one, of Rule 4, the words "by four tacks"; carried.

Rule 5. The Committee recommend that the words, "or indelible pencil" be stricken out.

Rule 7. The Committee recommend that the words, "before repairs are made" be stricken out.

Rule 11. The Committee recommend that the words "or indelible pencil" be stricken out of Rule 11. No objection was made.

Rule 19. The Committee recommend that there be added to Rule 19 the following: "Provided, however, that when cast or malleable iron is used credit shall be allowed at cast and malleable iron prices." No objection was made to the proposed change.

Rule 20. The Committee recommend that after the words "defect card" in the last full line the following words be inserted: "Which shall state the wrong material used, and." No opposition was made.

Rule 21. The Committee recommend that the first portion of Rule 23, in regard to settlement prices of cars, be changed as follows: That box and stock cars 32 ft. long and over be $300 instead of $272. That box and stock cars under 32 ft. long be $250 instead of $240. That gondola cars, eight-wheeled, 32 ft. long, be $200 instead of $150. That gondola eight-wheeled, under 32 ft. long, be $175 instead of $125. That flat cars, 32 ft. long or over, be $125 instead of $100; under 32 ft. long, $125 instead of $100.

Trucks.—That the word *channel* be stricken out, and the words *steel or* be substituted; and that the price be $275 instead of $250. No opposition was made to these proposed changes.

Rule 24. The Committee recommend that there be added to this rule the following: "Except in case of destruction of private cars, and the company destroying such car elects to return the trucks, it shall deliver said trucks, free of charge to the connecting road, if so required." No opposition was made.

Rule 25. The Committee recommend that the words

"when possible" be placed at the end of the sentence, instead of after "cars" in the preceding line. No opposition was made.

Rule 26. The Committee recommend that after the words "current market prices" there be added the words 'including freight," in the last paragraph but one of Rule 26. No opposition was made to the proposed change.

English Train Accidents.

A brief summary of the Board of Trade report of train accidents in Great Britain and Ireland for 1890 was printed in our last issue, together with condensations of the inspectors' reports on certain accidents that were inquired into. Herewith will be found additional accounts of investigations, omitted last week from lack of space.

At Brindle Heath, on the Lancashire & Yorkshire, Dec. 21, a freight train of 36 cars, running under a so-called "caution" signal through a block section about 3 miles long on a descending grade, was allowed to run too fast, and overran the home signal at the end of the section and fouled a passenger track just as a passenger train came along, producing a violent collision and injuring 25 passengers, of whom one died. The engineman of the freight excuses himself on account of the slippery condition of the rails, but his stories regarding the speed and the efforts he made to alarm the signalman and others when he found his train had eluded his control, are shown to be far from true. The grade was 66 ft. per mile, and the "caution signal" was to the effect that the block section was clear, but that the junction located in the next section was blocked. This sort of signal, "originally intended to be used for the admission of trains to stations where they have to be connected with preceding trains is becoming far too generally used," says Major Marindin. He thinks it would better be not used at all at ordinary junctions; certainly not where they are approached on descending grades. This means that trains should not be allowed to start for a station until the main track through the yard of that station is clear for them. The engineer in this case had not passed examination and his fireman was a green man. As the runner was a steady and experienced fireman, the inspector does not condemn his employment as a runner, but says that such a man should not be sent out without a good fireman. He had been on duty 12¾ hours, which is condemned.

On the London & Northwestern, Oct. 8, at New street, Birmingham, the engine of a passenger train was derailed at a frog as it entered the station at 10 or 12 miles an hour. No serious defect could be found in the engine or track, and Major Marindin attributes the derailment to an engine with a 15-ft. 8-in. rigid wheel base running too fast over a curve of 462 ft. radius. The radius of curve was supposed to have been 528 ft., and the gauge at the frog was ⅛ in. tight. There is no chance to elevate the outer rail, and so it is recommended that the speed be limited by rule to five miles an hour.

At Primrose Hill Tunnel, near Chalk Farm Station, on the London & Northwestern, Nov. 13, at 7:43½ p. m., a passenger train ran into the rear of a freight in the tunnel, making a violent collision and killing the freight conductor. The freight was held by a block signal, and the cause of collision was a failure of block working; one of two freight trains was forgotton in one signal box or the other. "Although in these cases it is hardly ever possible to be absolutely certain which of the two signalmen is at fault," Major Marindin finds the weight of evidence decidedly in favor of the man at the entrance of the section, and he discusses the particulars of booking, etc., at length. He refers to electrical systems of interlocking (such as the Sykes), and says that such a tunnel as this "seems to be a very proper place for the London & Northwestern to adopt such a system." The freight engineer, while waiting, might have whistled, to call the attention of the signalman, but he refrained on account of the rule to whistle as little as possible. The inspector says, however, that it is far more important to follow the rule about whistling when waiting for a signal than to be so careful about annoying people residing near the road. Major Marindin takes occasion to inform the public as to the fallacy involved in assuming that danger would follow if a signalman were to fall asleep at his post; and while recommending the employment of a booking boy at a signal box here, where the man in charge is very busy, expresses the conviction that a second signalman would be a source of danger rather than of safety. These remarks are called out by the verdicts of juries, which appear to be made up in London on the same principles that they are in New York.

On Dec. 10, a day characterized by a dense fog all about London, a slight collision occurred at the great Waterloo Station of the London & Southwestern, in London, where is located the celebrated tower containing 209 levers. The signalman testified that on this day there was a period of four hours when he did not and could not see a single engine or car out of the large number which passed his windows. The collision was in consequence of two engines going out from the engine house under the same signal, the second one running into the side of a passenger train. It appears that in clear weather it is customary for two or more engines to follow one another out without the signal being thrown to danger after each one, but in this case a man on the ground by a bit of carelessness allowed a second engine to pull out while the man in the tower thought he was admitting only one. The passenger train so struck was quickly stopped by the application of the automatic vacuum brake, but no one on the train knows how it was applied. "It may be that the valve on the guard's van was jerked open by the shock of the collision," but Major Marindin has never before heard of such a thing. He takes occasion to say that the signalmen, yardmen and drivers deserve great credit for carrying on work here as safely as they do, on such a day as Dec. 10.

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At Stoats Nest goods yard, on the London, Brighton & South Coast, Dec. 10, during a dense fog, a passenger train, running at 40 miles an hour, struck an empty car which a careless switching conductor had left standing on the main track. His fault was in not riding on the car farthest from the engine, and his excuse for this was that on account of the fog he would have been too far off to signal the engineer. He had been on duty 14¾ hours. The empty car probably broke off on account of a coupling jumping off the drawbar hook, but the car was so badly broken that no definite evidence could be obtained. Americans will be interested in the following remark of General Hutchinson:

"I am not aware of any practicable mechanical means by which the fact of a wagon having thus been left on the main line could prevent a signalman lowering the signals for that line. It might be possible electrically to prevent a signalman accepting a train under such circumstances by the insulation of one of the rails between (say) the home and advanced signals, and though I fear the conditions are too unfavorable to permit of perfect dependence being placed upon such electrical arrangements, it might be at any rate worth while to give the system a trial."

On the North British Railway, Nov. 11, near Gorgie at about 8 P. M., a passenger train ran into an empty engine which had been waiting at a home signal 22 minutes and had just started when it was struck. This collision was principally due to a failure of block working, and as in the cases at Primrose Hill and elsewhere, there is no conclusive evidence which signalman made the mistake; but the one at the outgoing end of the section frankly states that he will not deny that the other man sent a certain signal to him, although he has not the slightest recollection of it. He was much occupied with freight trains switching and probably forgot to enter the signal on his book. He might have seen the waiting engine and thus have avoided the blunder, but he did not look out along the track. The runner of the light engine disregarded the rule requiring him to send his fireman to the signal-box, and ought to have been "smarter" in starting his engine when the signal was lowered. In point of fact, this signal was pulled off for him before the passenger train got away from the preceding station, and he might, therefore, easily have started and kept ahead of the passenger train. The engineer of the passenger train saw the red tail light of the light engine, but, thinking it was upon a side track, did not slacken his speed. Major Marindin says he had no business to assume that this light was on the siding. The Major also again recommends interlocking of signals (such as the Sykes system), and adds:

"Another way which has been suggested would be by insulating a certain length of rails, as is done in places in America, and providing electrical arrangements which would lock the block instruments or the necessary signals so long as any axle were standing upon the length of rails insulated. This plan has not, however, been sufficiently experimented upon in this country to make it certain whether it is reliable, and if not reliable it would be worse than useless."

(To be Continued.)

Economy Tests of Various Forms of Fire-Boxes.

During the winter of 1888-9 an extended series of tests was made on the Eastern Railway of France to determine the relative economy of deep and shallow fire-boxes, with and without brick arches, water tables, deflectors, hollow stays, etc. The following summary is taken from a detailed account published in the *Revue Générale des Chemins de fer* for February, 1891:

The method followed was to make numerous analyses of gases drawn from the smoke-box during regular trips, the positions of the dampers and deflectors, and the amount of opening of the air passages above the fire being varied for each trip. Engines similar in other respects but with and without brick arches, were also tested. The samples of gas were taken from the smoke-box at a point about opposite the third row of tubes and about 14 inches from the tube sheet were led off through a pipe in the stack, and thence through an aspirator back to the dynamometer car, which was attached directly to the tender. In this car, two modified Orsat sets for gas analysis were placed. From 20 to 24 analyses per hour were made with each apparatus, and, in all, 56 complete tests are recorded, the number of analyses given in the tables averaging about 28 for each test. It was found necessary, in order to obtain uniform samples of gas, to turn the end of the pipe in the smoke-box toward the tube sheet, and to protect it from the action of the blast by means of a screen. Also, in taking smoke-box temperatures, the thermometers were similarly protected, or their ends were inserted in the tubes. Without this precaution the temperatures obtained at about 12 in. in front of the tube sheet ranged from 383 degrees Fahr. for the highest to 536 degrees for the lowest thermometer; but when protected, the temperatures indicated by all were sensibly the same, and were found to be from 590 degrees to 608 degrees Fahr. The coal used in most of the tests was bituminous refuse (*menus*), and was thoroughly wet before firing.

The best result given in the table was obtained with a locomotive having a deep fire-box with water table, 18.6 sq. ft. of grate surface, using *briquettes*. In this case 73.4 per cent. of the total heating power of the coal was utilized in making steam. This result is, however, closely approached by that from an express engine having a shallow fire-box with 25.8 sq. ft. of grate surface, and fitted with brick arch and air passages in the front end of the furnace, the efficiency being 72.2 per cent., using fine coal. As a general thing the large shallow fire-boxes with brick arches and open air passages in the front of the fire-box appear to have given the highest efficiency, while the same engine, without the arch and with air passages closed, gave about the poorest results, viz., from 52 to 54 per cent.

The principal deductions of the author from these experiments are briefly as follows:

For locomotives with large grates.—The brick arch is very advantageous for obtaining sensibly complete combustion and greater economy. Air passages in the front of the fire-box above the grate give excellent results whether there is an arch or not. The combustion is notably less economical when the air passages are closed. By opening the air passages a saving of from 5 to 11 per cent. was obtained with certain trains and from 3 to 13 per cent. with others. For the same size of exhaust nozzle, the combustion is the more complete as the air passages are opened wider and as the velocity of the gases in the tubes is less. The deflector gives results comparable with those with air passages, as described, when the locomotive is fitted with an arch.

For locomotives with deep fire-boxes.—The combustion is always excellent with a water-table, whether an arch or a deflector is used or not, but is not always as economical as with locomotives with large grates and with arch and air passages. The tests show that with locomotives having deep fire-boxes there is always a considerable excess of air supplied, regardless of the character of the service. This excess of air supplied, and the consequent loss of heat from the chimney, greatly reduce the advantages gained by complete combustion. The most economical combustion was obtained with an excess of air of about one-fifth.

It was found that the combustion was sensibly complete when coal was not drawn through the tubes, but when this occurred the loss was considerable. In the tabulated tests, the combustible drawn through the tubes varied from 1.0 to 11.6 per cent. of the combustible burned, the average for the best ten tests being 4.8 per cent.

The Chicago & Northwestern Lockout.

On May 14 the Chicago & Northwestern paid off its entire force of yard trainmen (switchmen), and as each man received his pay he also received a notice from the general manager reading as follows:

"The switching service of the Chicago & Northwestern Railway Company, as at present performed, is not satisfactory to the public nor to the management of the company. Therefore all yardmasters and switchmen now in the employ of the company are discharged from its service on and after 7 A. M., May 14, 1891. In reorganizing the switching service on this company's lines preference will be given to such men, previously in its employ, as are, in the judgment of the company, capable and worthy.

This summary and somewhat novel proceeding on the part of the road was the direct outcome of a series of strikes on that road by the switchmen, which have proved exasperating to the management and annoying to the public. The switchmen have repeatedly tied up the Chicago terminals on the most trivial pretexts. The last act of this kind occurred on March 23, when the switchmen demanded the discharge of yardmaster Frank McInery for discharging a switchman named Crowe, for refusing to switch certain cars. The switchmen struck at the busiest portion of the day, when the heavy suburban travel was beginning to move home, and rather than inconvenience its patrons the road acceeded to the demands of the men, but McInery tendered his resignation, pending investigation, and traffic was resumed. It has since developed that the real cause of the trouble was the fact that McInery was a member of the Brotherhood of Railway Trainmen. The officials at once determined that it was necessary to make a decided stand, and the action taken last week was the result. McInery was reinstated and a force of new switchmen sufficient to move all the passenger traffic and a good part of the freight traffic was quietly secured and put at work under police protection. The plan was most successfully carried through from its inception, and the men were completely nonplussed. The trainmen supported the road and took hold and helped

in yard work. About 400 men were discharged in Chicago and along the line.

The Supreme Council of the Federated Order of Railway Employés met at Chicago, May 16, but decided that the switchmen had not made out a case against the road and that the action of the road was justifiable. The leaders of the switchmen's association are naturally extremely bitter in their denunciation of the trainmen and firemen, but the public sympathy will not be with them. On the contrary, people commend the Supreme Council for taking a manly and consistent view of the situation and having the courage to vote according to their convictions, and the road's ultimatum, coming as it does from a corporation which conceded to be eminently fair in its treatment of its employés, will doubtless have the hearty support of the public and of all honest employés.

This action is likely to have a salutary effect on the switchmen of other lines in Chicago. For some time the switchmen had come to think that they and not the companies' officers were running the roads. At the time of the Stock Yards strike, a few months ago, a majority of the managers were strongly inclined to make a stand and settle the question then and there, but realizing the consequences of a tie up they naturally hesitated. The Northwestern has now supplied the lesson that was needed and it is to be hoped that it has been well learned.

Comparative Tests of a Johnstone Compound Locomotive.

The system of compounding locomotives designed by Mr. F. W. Johnstone, Superintendent of Motive Power Mexican Central Railway, was applied to a consolidation engine of that company in the summer of 1890. The designs were made more than a year earlier, and the work was begun in August, 1889, in the shops at the City of Mexico. It was not allowed to interfere with other work in the shops, however, and therefore occupied about a year.

The engine, No. 66, was a Rogers consolidation, built in 1882, with 20×24-in. cylinders and 50-in. drivers, weighing 82,000 lbs. on the drivers, with inside fire-box only 6 ft. long. This engine was so inefficient it was decided when taken out of service for general repairs to let it lie outside and await its chances of occupying a pit in the shops, which were always crowded with work upon more useful engines.

When the compound cylinders were put on, a new fire-box 9 ft. 4 in. long was also put in.

The comparative trials, particulars of which follow, so far demonstrated the economy and efficiency of the system that it will probably be made standard for all locomotives on the line as fast as renewals are made. Six 10-wheelers are now building at the Rhode Island Locomotive Works, compounded on the Johnstone plan, and 52 locomotives now in service will be changed as fast as possible.

The conditions in Mexico are peculiar in that the fuel expense is extraordinarily heavy—coal costing about $11 a ton on the Mexican Central. Therefore the General Manager and Superintendent of Motive Power were early interested in the possible economy of compounding and are particularly gratified at the results of the experiment.

The description of the design and the particulars of the tests are furnished to us by Mr. Johnstone. We shall shortly show one of the 10-wheelers now building in considerable detail, but meantime the engravings given herewith show the main points of the design.

The Design.—It will be seen that the high-pressure cylinder, which is 14 in. in diameter by 24 in. stroke, is placed within the low-pressure cylinder, which is 30¾ in. diameter by 24 in. stroke, or equal to a cylinder of 24¼ in. diameter after deducting the area of the high-pressure cylinder and the sleeve surrounding it. The ratio of the cylinders is three to one. The low-pressure piston is provided with two rods and the high-pressure with one. The three rods are secured to the same crosshead, both pistons acting in the same direction.

The valve, which is a very important feature of this design, distributes steam to both high and low-pressure cylinders, requiring but one valve stem, which is actuated by the link motion as formerly used on the locomotive, no change having been made in it. The valve is made in two sections, the outer portion distributing steam to the high-pressure cylinder, and the inner section to the low-pressure cylinder. The inner section is carried by the outer, and has one inch less travel, the outer traveling six inches, the inner traveling five inches. The object of this is to retard the point of cut-off to the low-pressure cylinder, and also to reduce the compression on the front of the high-pressure piston. By reference to the indicator cards it will be seen that this has been accomplished in a very satisfactory manner. For instance, when the high pressure admission is cut off at 9 in., the low pressure continues open to the admission of steam for 17 in. On the other hand, the compression on the high-pressure piston, which would begin at 9 in. piston travel, were both sections of valve made to move together with the same point of cut-off, does not take place until 17 in. in the high-pressure piston and 19 in. in the low-pressure. With 14 in. cut-off in the high-pressure cylinder, there is 20 in. cut-off in the low-pressure cylinder, compression beginning at 20 in. in the high-pressure and 22 in. in the low-pressure.

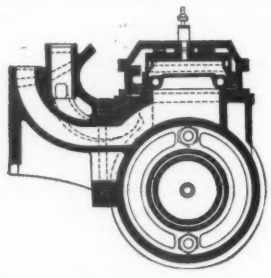

Fig. 2.—Cross-Section through Cylinder Saddle and Steam Chest.

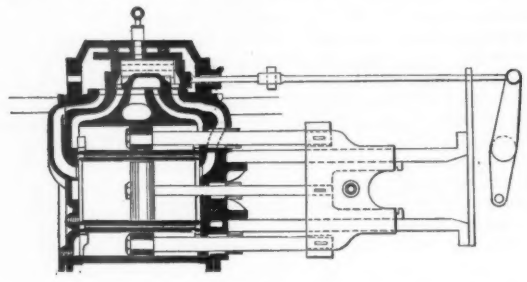

Fig. 3.—Longitudinal Cross-Section through Cylinder and Steam Chest.

JOHNSTONE'S COMPOUND LOCOMOTIVE.

A simple arrangement of starting valves enables the engineman to throw the engine into high pressure, steam being admitted through a reduced opening into the low-pressure cylinders. When this is done the high pressure piston is put into equilibrium, but the two low pressure pistons act with a force equal to two 24¼-in. pistons; therefore the engine has much greater starting power than any high-pressure locomotive of ordinary build.

THE TESTS.

The comparative tests which follow were made between this compound consolidation engine, No. 66, and a simple high-pressure consolidation engine, No. 107. The latter is a Baldwin locomotive of recent design with ample boiler capacity, 20-in. × 24-in. cylinders and 48-in. drivers. This engine has just been thoroughly overhauled in the Mexico City shops and was in perfect condition when the tests were made. The comparative boiler capacity of the two engines is indicated by the diagrams, fig. 2.

The tests were conducted by Mr. E. V. Sedgwick Master Mechanic of the San Luis Potosi Division, assisted by Mr. J. H. Ebert, Traveling Engineer. The crew in charge of Engine No. 107 were W. H. Spicer, engineer, and N. Campos, fireman. The compound engine No. 66 was under the charge of George B. Ridgely, engineer, and G. A. Daily, fireman. These crews were selected for their ability in getting good work out of their engines, and had been handling these engines for two months before the trial began.

It was decided to keep the record of trips between San Juan del Rio and Mexico City, as it was always possible to get full trains out of the former place, and these trains generally came through without breaking bulk. The profile of that part of the line is shown in fig. 3.

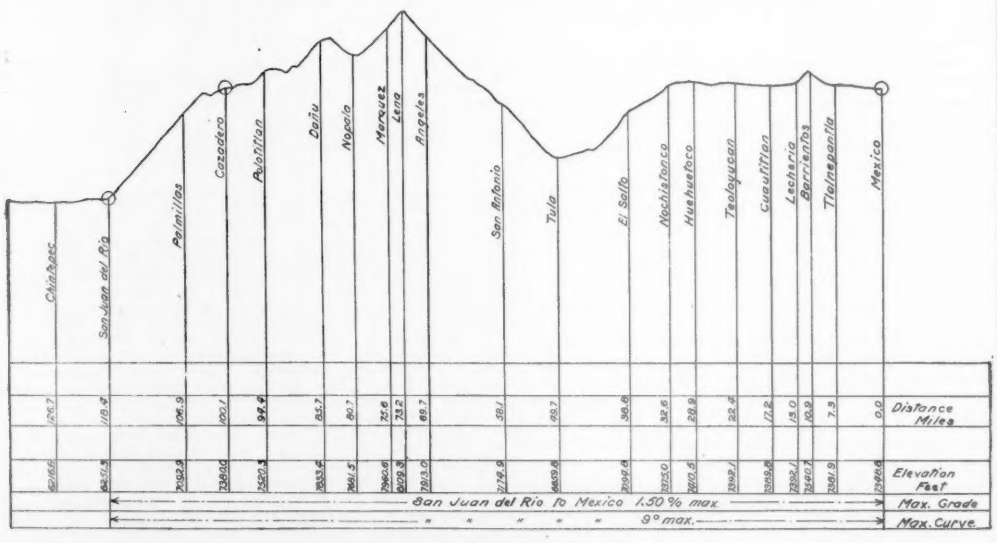

Fig. 1.—Profile of Line of Road.

TESTS OF JOHNSTONE'S COMPOUND LOCOMOTIVE.

The trains were weighed on track scales after having been made up, and just before starting.

Coal Record.—A coal car fitted with a platform, provided with platform scales, was coupled to the tank, and all coal put on the tender was weighed in boxes and taken up an incline to the tender. The coal car was hauled on each train, as it was desirable to keep a record of the performances of engines on the continuous grade from San Juan del Rio to Cazadero, as well as a record of the performance over the entire division. While the engine was standing in the engine-house at San Juan del Rio steam was kept up with wood. The tender was emptied of all coal, and a quantity thought to be sufficient to take the train to Cazadero was weighed and placed on it. The boiler was given a half glass of water and fire was made up with the coal which had been weighed out to the engine. This was generally done about 30 minutes before starting out with the train. If the coal weighed out to the engine was not sufficient to take the train to Cazadero more coal was put on the tender while running, and any coal remaining on the tank after reaching Cazadero was weighed and the amount deducted from the total. The same was done on arrival at Mexico.

Water Record.—The quantities of water used were arrived at in the following manner: A glass tube 5 ft. long was placed on each side of the tank, centrally, fore and aft, and connected to the bottom of the tank by

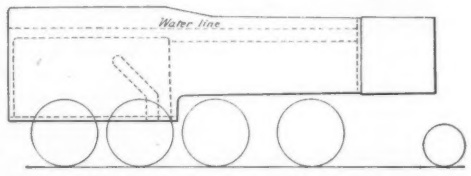

Fig. 4.—Mexican Central Engine No. 66, Compound.

pipes and suitable stuffing boxes to make a joint at the bottom of the glass tubes, the upper ends being left open. These tubes were protected by brass pipes with slots cut nearly their entire length to permit the water level to be seen. The tank was filled with water and the level shown in the two glass tubes was marked 0 on the brass pipes. Water was then drawn off into a barrel which had been carefully weighed, precaution having been taken to fill the barrel and let it soak over night to insure getting the weight of the empty barrel correctly. The barrel was placed on scales and filled until it contained 333⅛ pounds of water, then gauged at water line. Therefore, in measuring the tanks every three barrels of water drawn represented 1,000 lbs., and the level in the glass tubes was noted and marked accordingly, for each 1,000 lbs. drawn from the tank. Before starting fire with coal at San Juan del Rio, the water in the boiler was regulated to a half glass, and the height of the water in the tank noted, the mean of both tubes being recorded. When a water station was reached the height of the water in the tender was noted before and after taking water. As the 1,000-lb. marks on tubes were about two inches apart, it was an easy matter to ascertain accurately the quantity of water used between two given points. The water lost through the overflow of the injectors (Sellers' improved) was so inconsiderable that it was not taken account of. On the first trip this waste water was caught and measured, and found to be so little no further effort was made to take it into account. The blow-off cocks were used as sparingly as possible and when used no account was taken of the water thus thrown away.

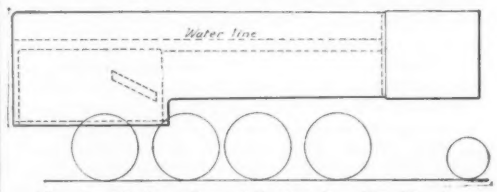

Fig. 5.—Mexican Central Engine No. 107, Simple.

These engines were not favored in any way; they lay over at sidings for trains, and did more or less switching at various points each trip. The object was simply to keep a record of coal and water used while the engines were doing their regular duty in freight service. The

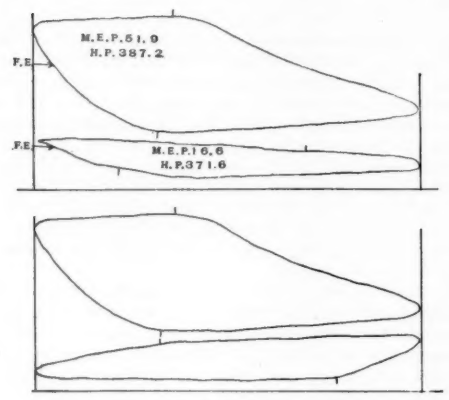

Fig. 6.

Cut-off: High pressure, 9; *low pressure,* 16¼. *Compresssion begins: High pressure,* 16¼; *low pressure,* 19. *Boiler pressure,* 150. *Revolutions,* 200.

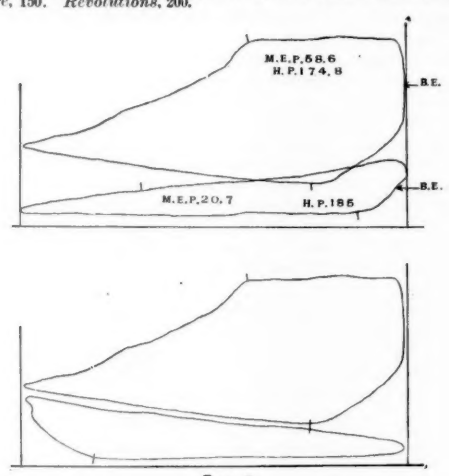

Fig. 7.

Cut-off: High pressure, 10; *low pressure,* 17½. *Compression begins: High pressure,* 17½; *low pressure,* 20. *Boiler pressure,* 150. *Revolutions,* 80.

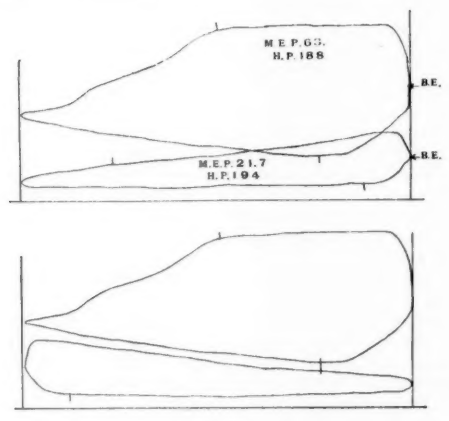

Fig. 8.

Cut-off: High pressure, 12; *low pressure,* 18½. *Compression begins: High pressure,* 18½; *low pressure,* 21¼. *Boiler pressure,* 140. *Revolutions,* 80.

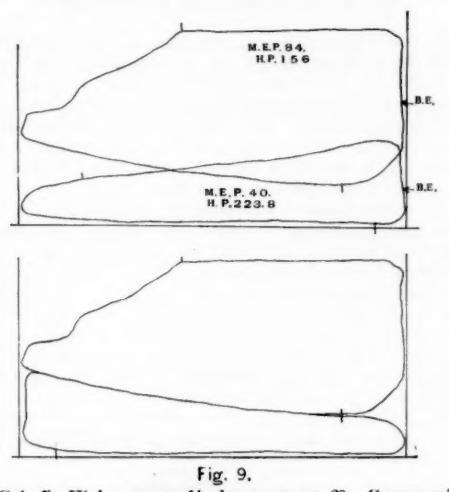

Fig. 9.

Cut-off: High pressure, 14; *low pressure,* 20. *Compression begins: High pressure,* 20; *low pressure,* 22. *Boiler pressure,* 150. *Revolutions,* 50.

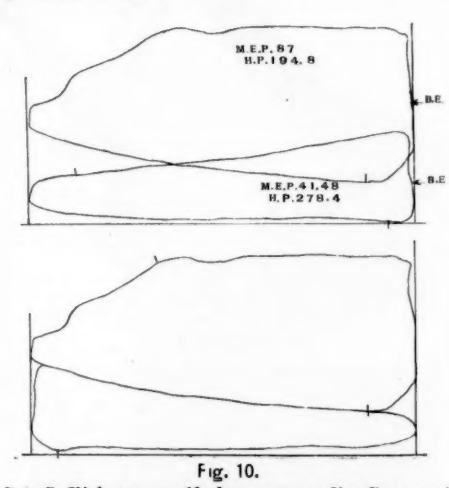

Fig. 10.

Cut-off: High pressure, 16; *low pressure,* 21. *Compression begins: High pressure,* 21; *low pressure,* 22½. *Boiler pressure,* 150. *Revolutious,* 60.

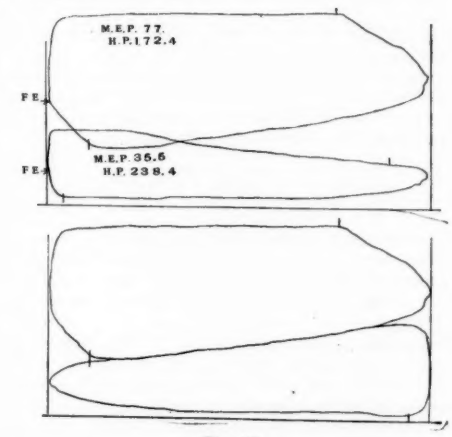

Fig. 11.

Cut-off: High pressure, 18; *low pressure,* 21½. *Compression begins: High pressure,* 21½; *low pressure,* 23. *Boiler pressure,* 150. *Revolutions,* 60.

INDICATOR DIAGRAMS.

Mexican Central Engine No. 66; Johnstone's Compound.

engineers were not interfered with, but were allowed to handle the engines as they had been accustomed to do.

Measure of Work.—Indicator cards were taken from each engine merely to show the action of the valve gear, and not for the purpose of attempting to arrive at the work performed by the engine for the trips, or for any given distance or space of time during the trip, as the horse power developed by a locomotive is constantly varying, and cards taken but a few minutes apart show that no reliance can be placed upon this method of ascertaining the amount of work done by a locomotive over a section of road, even when the grades are quite uniform. Seeing the necessity for a more comprehensive method of arriving at the duty of a locomotive in regular service for a trip or for a month's work, the Superintendent of Motive Power, Mr. Johnstone, decided in the latter part of 1834 to reduce the work done by all engines in freight and passenger service to so many Units of Work performed.

One hundred gross tons hauled one mile at a very low rate of speed, over a straight and level track, was taken as a Unit of Work. The profile of the road was carefully studied and the line reduced to an equivalent of a straight and level track (curves, being compensated, were left out of the calculation).

Tables were then made to facilitate the computation of the units of work done by each locomotive during the month. Separate tables had to be made up for passenger and freight service, as that for passenger trains was based upon a speed of 31 miles per hour, while the freight train table was based upon 16 miles per hour. This was necessary as the resistance due to speed is different for the two classes of service.

In arriving at the work done, all changes in the weight of trains are taken into account, and the units of work performed between any two points with a given weight of train is shown by the tables. The weight of train is taken from conductors' reports of loaded and empty cars, weight of engine and tender added; loaded cars averaged at 24 tons and empties at 12 tons. These figures have been checked with the year's gross and net ton miles and found to be very accurate. This system has been in use on the Mexican Central Railway for the past six years, and has proved most satisfactory. The performance of light engines on level divisions can be compared with that of heavy engines on the mountain divisions. The premiums given for the most economical use of fuel are determined by the units of work per ton of coal, shown on performance sheet for the month.

These years of experience having established the correctness of this method, it was decided to base the performance of the engines in the tests upon the units of work performed. But to be entirely assured as to the weight of the trains, each train was weighed before starting, as stated above. The trains were composed of cars bound for Mexico, and only in a few instances was the bulk of the train broken, and when this was done a careful note was taken of this change in weight.

The Comparative Results.—Table No. 2 shows two trips of each engine while using American coal. Table No. 3 shows two trips of each engine using English bituminous coal. Table No. 4 shows two trips of each engine using English patent fuel (briquettes of compressed coal). These 12 trips were made over the entire division of 118 miles. The profile of the road is shown in fig. 3. Tables Nos. 5, 6 and 7 show the performance of the engines with the three kinds of coal, between San Juan del Rio and Cazadero, on a continuous grade of 1¼ per cent.

The results of the tests show that the compound engine No. 66 has effected an economy of 25 per cent. in fuel and from 12 to 23 per cent. in water over the simple engine No. 107.

By reference to Table No. 1 it will be seen that the grate area, heating surface and boiler capacity, both in water and steam space, of the compound are very much less than those of engine No. 107. With these facts in

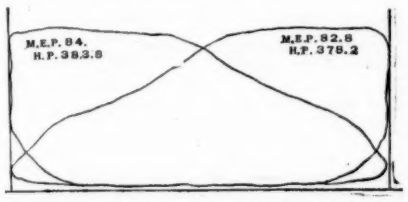

Fig. 12.—Indicator Diagram Mexican Central Engine No. 107.

Cut-off, 13. *Compression begins,* 19. *Boiler pressure,* 140. *Revolutions,* 60.

view, it is very evident that by compounding engine No. 107 more than 25 per cent. economy can be effected in coal consumption.

It will be noticed that the economy in water is not as great as in coal when comparing the compound No. 66 with engine No. 107. This is accounted for by the fact that engine No. 107 has 68 per cent. more cubic feet of steam space, and delivered much drier steam to its cylinders. Owing to the small boiler of the compound it was impossible to work the engine very hard, on account of the quantity of water which was entrained with the steam. This was very noticeable in taking indicator cards, not so much in the low pressure as in the high pressure cylinders. When working hard with lever set to cut off at 18 in. and throttle wide open, it was necessary to carry the water as low in the boiler as was safe, to avoid passing water over into the cylinders. No difficulty of this kind was experienced with engine 107.

Given a boiler with a capacity of that of engine No. 107 the compound would most certainly have shown an economy in water equal to that in coal, and in using less water the economy in coal would be greater than these tests have shown.

TABLE NO. 1.—LOCOMOTIVE DIMENSIONS.

	No. 66 compound.	No. 107 simple.
Cylinder, size	14 in. × 24 in.	20 in. × 24 in.
Ratio low pressure to high pressure	3 to 1	
Driving-wheel diameter	48 in.	48 in.
Number of drivers	8	8
Weight on drivers	100,000 lbs.	100,000 lbs.
Weight of engine and tank	180,000 lbs.	180,000 lbs.
Diameter of shell of boiler	52 in.	60 in.
Number of tubes	200	196
Size and length of tubes	2 in. × 11 ft. 7 in.	2¼ in. × 13 ft. 1 in.
Grate area in square feet.	21.5	30.4
Heating surface of fire-box in square feet	148	152
Heating surface of tubes in square feet	1,200	1,489
Total heating surface	1,348	1,641
Working boiler pressure	150	150
Water capacity of boiler in per cents.	100	118
Steam space of boiler in per cent. with water 6 ins. above crown sheet.	100	168
Grate areas of boilers in per cents.	100	141

TABLE NO. 2.—RUNS BETWEEN SAN JUAN DEL RIO AND MEXICO; BITUMINOUS COAL FROM SAN ANTONIO, N. M.

	Engine 66.		Engine 107.	
Date of trips	Nov. 15, 1890.	Nov. 25, 1890.	Dec. 10, 1890.	Dec. 12, 1890.
Total hours on trip	13:20	13:40	13:13	11:35
Actual running time	10:00	10:40	9:05	7:45
No. of cars in train	14	15	16	14
Total weight of train, including engine and tender, in tons of 2,000 lbs.	494	489	483	507
Total units of work performed	1,613	1,598	1,477	1,590
Pounds of coal consumed	13,300	13,200	15,800	16,000
Pounds of water used	74,000	73,000	82,000	83,000
Units of work per ton of coal	242.6	242.1	186.9	198.7
Units of work per ton of water	43.6	43.8	36.0	38.3

Result.—Average [of two trips shows compound engine No. 66 doing 24 per cent. more units of work per ton of coal and 18 per cent. more units of work per ton of water than simple engine No. 107.

TABLE No. 3.—RUNS BETWEEN SAN JUAN DEL RIO AND MEXICO; ENGLISH BITUMINOUS COAL.

	Engine 66.		Engine 107.	
Date of trips	Jan. 17, 1891.	Jan. 20, 1891.	Jan. 2, 1891.	Jan. 4, 1891.
Total hours on trip	15:20	11:45	9:10	10:45
Actual running time	10:00	7:30	7:20	8:40
No. of cars in train	14	14	15	15
Total weight of train, including engine and tender, in tons of 2,000 lbs.	491	492	424	431
Total units of work performed	1,604	1,607	1,385	1,408
Pounds of coal consumed	12,060	12,090	12,900	13,100
Pounds of water used	69,000	70,000	73,000	74,000
Units of work per ton of coal	267.3	263.0	214.7	214.9
Units of work per ton of water	46.6	45.9	37.9	38.0

Result.—Average of two trips shows compound engine No. 66 doing 24 per cent. more units of work per ton of coal and 21 per cent. more units of work per ton of water than simple engine No. 107.

TABLE No. 4.—RUNS BETWEEN SAN JUAN DEL RIO AND MEXICO; ENGLISH PATENT FUEL (BRIQUETTES OF PRESSED COAL).

	Engine 66.		Engine 107.	
Date of trips	Jan. 11, 1891.	Jan. 15, 1891.	Dec. 27, 1890.	Dec. 30, 1890.
Total hours on trip	12:02	1:25	13:00	11:05
Actual running time	10:00	9:00	7:25	8:45
No. of cars in train	15	14	16	16
Total weight of train, including engine and tender, in tons of 2,000 lbs.	506	491	455	438
Total units of work performed	1,653	1,604	1,426	1,431
Pounds of coal consumed	10,800	10,700	11,900	11,800
Pounds of water used	75,000	73,000	81,000	80,000
Units of work per ton of coal	306.0	300.0	239.6	242.5
Units of work per ton of water	44 0	43.9	35.2	35.8

Result.—Average of two trips shows compound engine No. 66 doing 25.7 per cent. more units of work per ton of coal and 24 per cent. more units of work per ton of water than engine No. 107.

TABLE No. 5.—RUNS ON CONTINUOUS 1½ PER CENT. GRADE FROM SAN JUAN DEL RIO TO CAZADERO; COAL FROM SAN ANTONIO, N. M.

	Engine 66.		Engine 107.	
Date of trips	Nov. 15, 1890.	Nov. 25, 1890.	Dec. 10, 1890.	Dec. 12, 1890.
Hours on trip	2:20	2:15	2:10	2:05
No. of cars in train	14	15	16	14
Total weight of train, including engine and tender, in tons of 2,000 lbs.	494	489	483	507
Pounds of coal consumed	4,150	4,100	5,100	5 100
Pounds of water used	19,000	18,000	20,100	23,000
Pounds of water evaporated per lb. of coal	4.5	4.4	3.9	4.2
Pounds of coal burned per sq. ft. of grate surface per hour	84.8	80.0	77.5	85.4
Pounds of water evaporated per sq. ft. of heating surface per hour	5.6	5.9	5.7	6.7
Total units of work performed	499	494	488	512
Units of work per ton of coal	241	241	191	199
Units of work per ton of water	52.5	44.9	48.5	44.5

Result.—Average of two trips shows compound engine 66 doing 26 per cent. more units of work per ton of coal and 15 per cent. more units of work per ton of water than engine 107.

TABLE No. 6.—RUNS ON CONTINUOUS 1½ PER CENT. GRADE FROM SAN JUAN DEL RIO TO CAZADERO; ENGLISH BITUMINOUS COAL.

	Engine 66.		Engine 107.	
Date of trips	Jan. 17, 1891.	Jan. 20, 1891.	Jan. 2, 1891.	Jan. 4, 1891.
Hours on trip	2:20	2:20	2:10	2:00
No. of cars in train	14	14	15	15
Total weight of train, including engine and tender, in tons of 2,000 lbs.	491	492	424	431
Pounds of coal consumed	3,700	3,600	4,000	4,000
Pounds of water used	20,000	19,000	20,000	20,500
Pounds of water evaporated per lb. of coal	5.4	5.2	5.0	5.1
Pounds of coal burned per sq. ft. of grate surface per hour	73.8	71.6	69.8	65.7
Pounds of water evaporated per sq. ft. of heating surface per hour	6.3	6.4	5.6	6.2
Total units of work performed	496	497	428	435
Units of work per ton of coal	268.0	276.0	214.0	217.5
Units of work per ton of water	49.6	52.3	42.8	42.4

Result.—Average of two trips shows compound engine 66 doing 26 per cent. more units of work per ton of coal and 19 per cent. more units of work per ton of water than engine 107.

TABLE No. 7.—RUNS ON CONTINUOUS 1½ PER CENT. GRADE FROM SAN JUAN DEL RIO TO CAZADERO; ENGLISH PATENT FUEL (BRIQUETTES OF PRESSED COAL).

	Engine 66.		Engine 107.	
Date of trips	Jan. 11, 1891.	Jan. 15, 1891	Dec. 27, 1890.	Dec. 30, 1890.
Hours of trip	2:30	2:15	2:00	2:10
Number of cars in train	15	14	16	16
Total weight of train, including engine and tender, in ton of 2,000 lbs	506	491	455	438
Pounds of coal consumed	3,300	3,200	3,700	3,600
Pounds of water used	22,000	20,700	22,500	25,000
Pounds of water evaporated per pound of coal	6.7	6.5	6.1	5.7
Pounds of coal burned per square foot of grate surface per hour	61.3	66.2	60.6	55.0
Pounds of water evaporated per square foot of heating surface per hour	6.5	6.8	6.8	5.8
Total units of work perfo med	511	496	460	442
Units of work per ton of coal	309	310	249	246
Units of work per ton of water	46.4	47.9	40.8	43.1

Result.—Average of two trips shows compound engine 66 doing 25 per cent. more units of work per ton of coal and 12 per cent. more units of work per ton of water than engine 107.

The Buffalo Continuous Hand-Shear.

The hand-shear herewith illustrated has but recently been placed on the market by the Buffalo Forge Co., of Buffalo, N. Y. It is specially designed for use in boiler and other shops where a reliable hand-shear is at all times a necessity. The design is quite unique, and consists of a combination of levers so arranged and operating in connection with each other as to effect a powerful up-cutting force at the blade edges.

The moving blade is placed below, and the cutting is done from the bottom of plate in an upward direction. The increased force developed by the combination of levers enables one man to accomplish as much as any two men could do with the old fashioned single-lever machines. The cutting edges of the blades are long, the levers are long and sweeping in their action, and a "continuous cut" is the result of their operation.

Actual test and continuous service has shown this machine to be efficient and powerful. It is made in four sizes to shear plate of one-eighth to three-eighths inch thickness, and the several parts are made to

gauge, and hence are interchangeable from one machine to another.

In addition to the tool described the manufacturers have brought out a combined punching, shearing and bar-cutting machine, made after a similar design and operating in an equally effective manner.

The Latest Armor Test.

A special test of armor plates of American manufacture was made at the Annapolis proving grounds in the first week of May. The intention had been to open the new proving grounds at Indian Head with these tests, but the grounds were not ready.

The results of the test are of the highest importance, and will have a marked influence in armor-plate manufacture at home and abroad, with nickel-steel mixtures in the lead. Five plates were made by Carnegie, Phipps & Co., embracing all the more important mixtures, types and constructions showing favorable results from previous trials. The plates may be enumerated as follows: One plate of ordinary all-steel; one plate of nickel-steel, similar in mixture and construction to the successful Schneider plate of last September's trial; one nickel-steel plate of higher carbon mixture; one all-steel plate treated after the Harvey carbonizing process, and one plate of nickel-steel also treated after the Harvey carbonizing process.

The result of the Harvey process and treatment is the extra charging of the exposed surfaces with carbon to such an extent as to give it the capacity to receive upon its immediate surface a high temper and extreme hardness to any extent, as may be desired, with the object of breaking up the projectiles and hindering penetration. This tempering and hardening is continued to a varying depth according to the thickness of plate treated, leaving a sufficient backing of milder metal to hinder a general cracking or breaking through of the whole plate.

The plates were 3 in. thick and 8 × 6 ft. on the surface. Twenty 6 pounder shots were fired at each plate from a Hotchkiss gun with its muzzle at a distance of 35 ft. from the surface of the plate. The velocity of the shots was some 1,800 ft. per second. Carpenter forged steel armor-piercing projectiles were used.

The ordinary all-steel plate was easily penetrated and showed the expected weaknesses at once, being well pierced by almost every shot, and badly cracked at the finish. The plate of Schneider mixture was penetrated by a majority of the shots, but held together without a perceptible crack. The plate of higher carbon mixture successfully resisted penetration without cracking. It was, however, badly bulged, but was still in good shot-resisting condition at the finish. The all-steel Harvey-treated plate held a good second place in the contest. Only two out of the 20 shots fired entered the plate to a depth of two inches, the other shots resulting in but shallow indentations. A slight crack was visible in this plate at the finish. The nickel-steel Harvey-treated plate showed first-class shot-resisting ability. Not one of the 20 shots fired at it succeeded in making an indentation of more than a quarter of an inch depth. A slight crack, however, showed itself in this plate too at the end of trial, demonstrating in both cases the possible existence of surface strains arising from the tempering and hardening. An examination of the back of the plate showed it to be in its original condition without crack, bump or blemish. This test as well as that of last September shows an undoubted advantage in the nickel-steel over all-steel, and a quite marked advantage over the Cammell compound plates.

A first and quite important conclusion developed by this test is the possible reduction in thickness of armor plating to the extent of 15 to 20 per cent., and a consequent reduction in the weight of armor carried. A second and equally important conclusion is the admitted accomplishment of all the advantages derived from compound armor with the additional advantage that the surface is not at all so liable to be broken away, crushed or displaced in sections. In the one case with the compound armor a veneer of hard metal welded to a soft and milder backing only can be claimed, while in the other, the Harvey armor, an inherent blending of the extra hard shot-breaking surface of the plate with a softer and more tenacious backing is assured.

At the test of last February, a Harvey plate of 10.5 in. thickness and the usual test plate size of 8 by 6 feet surface was struck by six shots from a 6-in. rifle. It showed some quite serious cracks at the finish, but it had shattered three of the projectiles, two of which had penetrated only 5 in., and one had just passed through the plate. The muzzle of the gun was set 28 ft. from the plate and the initial velocity of the projectile was some 2,000 ft. per second.

The usual percentage of nickel in the plates is about 5 per cent. The main test now will in all probability be the extent and depth to which the tempering and hardening of the Harvey process shall be carried to make the plates the most efficient in service.

Pressed Steel Brakebeam and Shoehead.

The accompanying engraving shows a new steel brakebeam which the Schoen Manufacturing Co., of Pittsburgh, has recently added to the list of articles of pressed steel that the company is making for car construction.

The compression member of the truss is formed in dies to the shape shown in section in fig. 1. The tension member is formed to fit into the cavity on the under side of the compression member at the ends, and then it is lapped over the compression members. The construction of the end is shown in section in fig. 2. The strut is forged and can be replaced, if necessary, by any ordinary blacksmith, without disturbing any other part of the beam. The shoehead is of pressed steel, two designs being shown, one for the Collins, the other for the Christie shoe. These heads are a great improvement both as to strength and lightness. A boss pressed up on the head fits into the cavity of the tension member of the beam; through this passes the bolt which holds the head to the beam.

These brakebeams can be made of a moderately high carbon steel (there being no welding), and a tensile strength of 80,000 lbs. per square inch can be obtained, as against about 50,000 lbs. per square inch when iron is used. The difference in quality of material, together with the form of the sections from which the beams are constructed, makes it possible to produce a very strong beam of light weight. It is held that, in addition to strength and stiffness, a good brakebeam must have elastic resilience in a large degree in order that it may be able to absorb sudden shocks or blows without injury. This quality is present in this brakebeam in a high degeee. The form of the truss, together with the quality of the material (spring steel), renders this design of brakebeam exceedingly stiff, and also enables it to absorb sudden shocks or jars to a greater degree than is possible with an iron beam. A great deal of experimenting has been gone through with in order that the very best results might be obtained, and the physical tests have indicated that the design is very efficient.

The company has added the necessary machinery to its plant to enable it to manufacture 600 complete brakebeams per day, and with these facilities they can be produced at a low cost.

TECHNICAL.

Manufacturing and Business.

The new buildings for the Baltimore Electric Refining Co. at Baltimore, Md., will be made of iron, designed and built by the Berlin Iron Bridge Co., of East Berlin, Conn. The rolling-mill will be 56 ft. in width by 180 ft. in length; the refinery building will be 130 ft. in width by 80 ft. long, and the boiler-house will be 49 ft. in width by 50 ft. long. The buildings will be entirely of iron, no woodwork being used about the construction in any way.

The contract for the iron and steel work needed for the extension of the terminals of the East River Bridge in New York city and Brooklyn was awarded to the Phœnix Iron Company at its bid, $107,489. The contract for the woodwork was awarded to John S. Orr & Co., the lowest bidders, at $9,034.

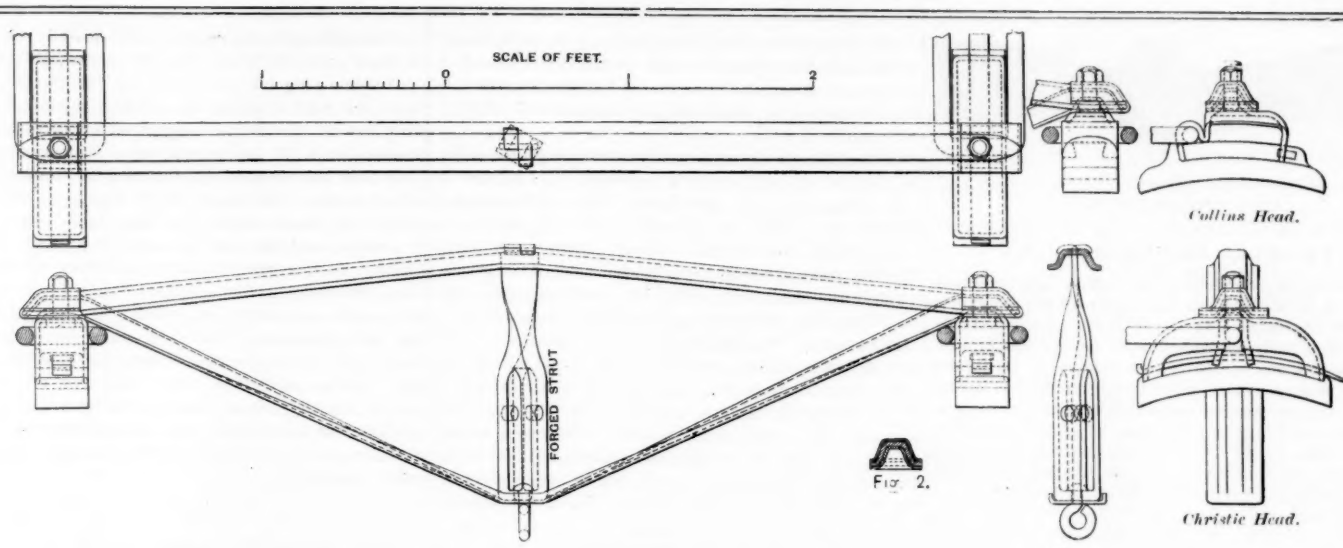

Fig. 1.

PRESSED STEEL BRAKE BEAM AND SHOE HEAD.

Made by the SCHOEN MANUFACTURING COMPANY, *Pittsburgh, Pa.*

New Car Shops.

Work on the new Canadian Pacific car shops, to replace those recently destroyed by fire, at Montreal, has commenced, and they will be completed within five weeks. They will occupy the site of the old ones, and will be well built upon the same plan throughout, and will be fitted up with new machinery and appliances.

The Buffalo shops of the Wagner Palace Car Co. are badly cramped for room, but this will be relieved when the new erecting-shops are completed. The centre shop is nearly ready, and will give a space 468 ft. × 104 ft., in which work may be carried on. The new erecting-shop is to be built so that light may be obtained from both sides and from the roof also.

The Norfolk & Western has awarded the contract for the building of the railroad shops and round-house at Shenandoah, Va., on the Shenandoah Valley road, to John P. Pettyjohn, of Lynchburg. The cost of the buildings will be $50,000.

The Prince Edward Island Tunnel.

One of the Government Ministers stated in the Dominion Parliament last week that the Government had received from Sir Douglas Fox estimates of the cost of building the proposed tunnel across the Straits of Northumberland, from Prince Edward Island to the mainland. The estimated cost of the tunnel from shaft to shaft, including the land tunnels and other contingencies, was: For a tunnel 11 ft. in diameter, £1,075,200; for a tunnel 14 ft. in diameter, £1,971,800, and for one 18 ft. in diameter, £1,999,000.

Flange Rails in India.

Up to the present time double-headed rails hold their own on the broad-gauge lines of India. The latest addition, however, to the broad-gauge system of that country, the Bengal-Nagpur Railway, is laid with flange rails, and other roads using the double-headed rail have laid short sections with flange rails in order to use steel sleepers. *The Indian Engineer* says that now that metal ties have became so important an element on the Indian railroads, it is probable that other companies will adopt the flange rail.

Lake Shipbuilding.

In view of the low opening freight rates not many boats for private account are being laid down on the lakes, but Cleveland yards have secured the construction of three light house tenders for the Atlantic coast, which will keep the yards at that city busy for the season. In addition to these three vessels, four others are building or launched for the Atlantic, viz., two whale-shaped barges building at West Superior, Wis., a twin-screw steamer for the Nicaragua Canal Co., and the "Keweenaw," built by Wheeler & Co., West Bay City, Mich. All of these except the "Keweenaw" will go through the Welland Canal entire. The "Mackinaw," a sister ship to the "Keweenaw," was launched entire last season, and cut in two at Bufffalo, so that it could pass through the Welland Canal, and then reunited at Montreal. The "Keweenaw" was launched on the 2d inst. in two sections, and will be towed across Lake Erie in detached parts, as well as across Lake Ontario, at an estimated saving of $5,000. The vessel, like most lake-built vessels, was built (and launched) side on, and was held together where it was to be separated, by bolts instead of rivets. Before launching, the two parts of the vessel were drawn apart.

Another launch was the twin-screw, triple-expansion, steel passenger steamer, "Virginia," for the Goodrich Transportation Company, built by the Globe Iron-works. She is to run between Chicago and Milwaukee, 80 miles, in five hours, stopping at Racine. She has eight bulkheads in all, so that if she were cut in two in the middle both ends would float. The dimensions are 278 ft. over all, 38 ft. beam, and 25 ft. deep. And the Cleveland *Marine Review* says: "She is the finest ship that flies the American flag." A speed of 22 miles per hour is expected of her.

The Detroit Dry Dock Company launched a large ore carrier on the 2d., 33 ft. over all, 42 ft. beam and 24 ft. hold, with triple-expansion engines. She is expected to carry 2,700 gross tons of ore, and has a bulkhead running fore, and aft through her water bottom, so that she can be listed to facilitate the movement of cranes or other machinery used in handling cargo. Messrs Hoar, Hale, Dolph and Gray, members of a Senatorial Committee on Canadian Relations, were present at the launch. About 20,000 tons of large vessels have been launched on the Lakes during the two weeks ending with May 2d.

The Vesuvius and its Dynamite Guns.

An efficiency trial of the Vesuvius is to take place at an early date in the lower Chesapeake Bay. The range, efficiency and accuracy of the fire of the guns are to be carefully noted, and the general operative efficiency of the vessel as a whole is to be tested, including speed and maneuvering. Dynamite is not to be used in the coming test, as the naval authorities do not favor its use as an explosive; its well-knowm dangerous character, even in its storage and handling, being the reason for a most emphatic opposition. Gun-cotton is to be substituted as a lighter and less dangerous explosive. Should it be found that gun-cotton cannot be used with similar effects to those of dynamite, the Vesuvius is to lose rank as a high-explosive cruiser and take her place as a torpedo cruiser, to which she will be altered. So far, the Vesuvius has never had a first-class trial, even with gun-cotton, so that the results of the trial are looked for with no little curiosity. The most doubtful feature in the whole construction is the fixed position of the three guns as a part of the vessel. The direction of fire can only be changed by moving the vessel, and the range can only be varied by increasing or decreasing the force or pressure of the air used. The gun is the vessel and the vessel is the gun. The results of any one or more discharges will as a consequence be always doubtful until accomplished.

A Subaqueous Tunnel in France.

The Western Railroad of France will, it is said, build a tunnel under the Seine, near Quillebœuf. The total length of the tunnel is 14,760 ft.; 6,560 ft. of this is through solid ground, and the tunnel will be driven by the usual methods. The 8,200 ft. which passes under the bed of the river will be in a soft alluvial deposit, and will be built with cast-iron lining, circular in section. The tunnel will be single track.

The Windsor-Detroit Tunnel.

The men at work on the Detroit River tunnel for the Michigan Central were discharged after 300 yards of earth had been plowed up. The work begun on the proposed tunnel the other day was only to hold the company's charter, which would have expired on May 4 had a begining not been made. The company is now asking for an extension of time to complete the tunnel.

The Sault Ste. Marie Canal Lock.

An Ottawa dispatch reports that the Dominion Government has decided to build the lock on the Sault Ste. Marie Canal 100 ft. wide, instead of 85 ft., as originally intended, the increased width being deemed essential owing to the rapid development of traffic between Ontario and Lake Superior ports. The lock will be 600 ft. long, having guard-gates at both ends facing in opposite directions, entrances being 60 ft. wide.

THE SCRAP HEAP.

Notes.

The annual convention of the Order of Railway Conductors, in session at St. Louis, has elected J. P. Daniels Grand Secretary.

Oswego papers say that 130 men have been discharged from the shops of the Rome, Watertown & Ogdensburg since the road was leased to the New York Central.

The Florida House of Representatives has passed a bill repealing the Railroad Commission law of 1887. This law provides for three commissioners and involves an annual expense of $15,000.

The estimate of the damage from the forest fires in the Northwest aggregates from $3,000,000 to $5,000,000. Persons competent to judge say that no such serious damage has been done for 30 years.

The New York Central requires conductors to send in an accurate account of the total mileage traveled by the passengers on each train. The work has heretofore been done by clerks at headquarters.

The Minnesota Legislature has been investigating a "wheat steal" at Duluth, testimony being presented to the effect that there was collusion between railroad elevator and state officials, which permitted at least 200,000 bushels of high-grade wheat to be spirited away. Wheat was loaded at night and billed as screenings.

A dispatch from Ilium, a small mining camp on the Rio Grande Southern road, says that during the last week 400 sacks of mail, weighing 45,000 lbs., have arrived there. The sacks contained newspapers mailed at New York, put up in two-cent wrappers and all addressed to one man. The dispatch adds that this is the period when railroads weigh mail matter, on which their pay from the government is based.

No Postponement on Account of [Warm] Weather.

A Canadian correspondent writes that a number of capitalists and engineers have just returned from the Lake St. John region (Quebec), where they have been making an exhaustive test of a snow-plow. This place (the Quebec & Lake St. John Railroad) was selected because it is "the only road in America where snow is found at this season of the year." The roadmaster and a force of men piled up high mounds of snow on the track and packed it down as hard as it is found after the severest snowstorms in this region. The plow was attached to an engine, and made its way through the mass of snow at the rate of twenty miles an hour, throwing the snow forty feet from the track. There is no telling how much farther the snow might have been thrown if the plow had not been hampered by the engine to which it was "attached."

The Day of Small Things in England.

In a recent lecture before the Cleveland (England) Institute of Engineers Mr. W. Cudworth, of Darlington, speaking of the signaling in vogue on the central division of the Northeastern Railway, said that not long ago he found an old report, dated Aug. 19, 1851, in the handwriting of his father, then one of the engineers of the Stockton & Darlington, in which it is stated that as the company were about to erect three or four new signals, it would be well to consider whether to perpetuate the present kind or "to make them on an improved plan, to which all the signals on the line might be gradually assimilated." It went on to the statement that the general adoption of the semaphore, then a new thing, and the subject of a patent would involve "the reconstruction of upwards of 20 signals, at a cost probably little short of £200." At present there are 212 levers in the three signal cabins at Darlington station alone, and the cost of signals, cabins, interlocking and connections would probably be not far short of £7,000. The interlocking in use on the central division of the Northeastern is known as Heron's mitre lock. It is simple, accessible, durable, and inexpensive, easily altered (by properly qualified men), and its lock is very close, a movement of one of the levers of ¼ inch being sufficient to lock all the others connected therewith.

Bridge Failure at Norwood, England.

The Engineer of May 8 prints a view of the bridge which broke under a passenger train at Norwood Junction on the London, Brighton & South Coast, May 1, as reported in the *Railroad Gazette* May 15. Only the hind car fell through and only one person was badly hurt. The bridge was made of 18-ft. cast-iron girders, and the report that it had been adjudged "inadequate for the traffic" had reference only to the street underneath, which, in accordance with an agreement between the railroad and the town, was to be widened. After stating that the train was running at from 40 to 50 miles an hour, that the engineman felt his leading wheels jump the track as he crossed the bridge, and that the Westinghouse brake, which was instantaneously applied on every vehicle in the train, mitigated the damage and injury to a remarkable degree, *The Engineer* goes on to say: "The rails across the Portland road are carried upon crossbeams resting upon a pair of cast-iron girders for each line of rails. These girders are of a pattern largely used for the small bridges on the line. They are about 2 ft. 4 in. in depth, and have a bottom flange about 16 in. in width, the web being out of the centre of this to give a wide seat for the crossbeams. Of the pair of these girders carrying the line used by the express, the near girder broke not far from the middle, and a blowhole showed itself partly in the web and partly in the flange. There were evidences also at the place of fracture of some misplaced pieces of nailrod, such as are used by molders for supporting an overhanging lift in a mold, or a piece such as that between two near gussets. It is remarkable that this flaw did not cause the failure of the girders long ago. That the girders are ample for their work, their long existence and failure of only one out of two in this case proves. It is not true that one of these girders broke some years ago. No better material can be used than cast iron for small bridges where there is room, but it is not now used where it must carry heavy and suddenly applied loads which are supported by resistance to transverse stress."

Railroad Hospital Service.

Dr. W. B. Outten, of the Missouri Pacific, in an address at the annual meeting of the Railroad Surgeons' Association, at Buffalo May 1, stated that there are now 39 roads on which a surgical system is organized, covering 76,000 miles. There are in the country 25 railroad hospitals, treating 136,000 sick and injured employés yearly. One of the noticeable advantages of the systems is found in the facility they afford for removing sick employés from malarial portions of the country to more salubrious locations. The assessments upon employés for the support of the hospitals are usually from 25 to 50 cents a month, and it is asserted that the men highly appreciate the benefits they receive, not deeming it worth while to bother with the question of the technical right of a railroad to thus assess its employés. The speaker believed that railroad employés very generally pay out more money in donations to sick or unfortunate fellow-workmen than it costs them to contribute their share toward the support of a hospital system. Several hospital systems have now been established a number of years, and as compulsory assessments naturally stimulate whatever prejudice exists, the speaker concluded that the benefits unmistakably outweigh all objections.

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Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

We give in this issue Mr. Johnstone's very interesting account of the tests made to determine the relative economy of a compound locomotive on the line of the Mexican Central. The evident care taken to secure accurate results gives these tests much value, and the economy shown is no more than one may reasonably expect. The tests were in regular service, 12 trips for each engine, all conditions carefully equalized and a decided advantage on the side of the simple engine in heating surface and boiler capacity. The economy of fuel was about 25 per cent. This means more on a Mexican road than it does here. The expenditure for locomotive fuel on the Mexican Central in 1890 was $864,276 (Mexican currency). A saving of one-fourth of this, $216,069, would have increased net earnings nearly 10 per cent. The locomotive fuel account on that road is the largest single item of operating expense, being 22 per cent. On the Atchison, Topeka & Santa Fe the locomotive fuel is 11 per cent. of the operating expenses; on the Louisville & Nashville it is 8 per cent., and on the Lake Shore and the Erie it is 6 per cent. It will be seen from these examples that fuel economy is relatively far more important in Mexico than it is in the United States. And in view of the excellent results obtained with its first compound it is not surprising that the Mexican Central should contemplate changing about one-third of its locomotives to compounds at once, which we are told is the fact. We shall consider these tests further in a later issue, when we shall publish drawings of the 10-wheelers now building, compounded on the 4-cylinder system shown rather inadequately in this issue.

In another column we give an account from *The Engineer* of the bridge failure at Norwood Junction, in England, of which mention was made in the *Railroad Gazette* of last week. This occurrence repeats the lesson which engineers in the United States learned long ago, that cast iron is deceptive and uncertain, and should not be used in large masses or for important members in bridges; and such use of the material has been abandoned here, although our castings have a considerable superiority in strength over those made in England, due chiefly to the better character of our ores, which afford a stronger metal than do those of Great Britain. It is not at all probable that there is any confidence in cast iron as a bridge material now left among engineers in that country, or that any of them would now use it for the girders of the bridges on the London, Brighton & South Coast road; but being there, the distrust of them has not been so acute as to cause the management to incur the cost of their removal, and the substitution of suitable beams of wrought iron or steel. The General Manager of the road says the disaster "arose in consequence of a latent flaw (which could not have been discovered)." Professional men will feel no surprise at this sudden revelation, but will surmise that there are probably many more such flaws lying in wait in the numerous similar girders upon that line, to be discovered with perhaps more serious results than accompanied this display of invisible defects.

Yet although the rupture of a cast-iron girder is not so new as to require much comment, the failure of *The Engineer* in its duty toward the profession and toward the public in its notice of the occurrence is conspicuous, and at this distance appears shameful. It is the duty of the technical press, on such occasions, to state the exact truth and to instruct the public, not to deliberately mislead it, as *The Engineer* has done in this instance. The statements of that journal "that the girders are ample for their work," "no better material can be used than cast iron for small bridges," are intended to misinform and are probably meant for the use of the uninstructed portion of the press, which would be ready to quote false statements like these from a scientific journal, in excuse of the neglect of the railroad officers. This breakdown of a reputable journal seems to us a much more serious indication of unsoundness than the failure of a bridge.

The Erie signaling at Jersey City, illustrated in this issue, is noteworthy as being "more English" than most plants of the kind in this country, particularly in the entire absence of the Morse telegraph. The men at the different points in the yard being able to send all their ordinary communications by bell-code or semi-automatic apparatus, and having telephones at hand for emergencies, the familiar click of the sounder is not heard, and the slavery to specially trained Morse operators (or to patience-destroying "plugs") is for once done away with. The three block sections to be established between the towers will also get along without Morse operators. Although the Sykes locks will not be used, the signaling from one station to another will be done by a bell code, which is quickly learned by any one. This is the first instance that we have noticed, on so large a scale, where the Morse system is dispensed with. In one view of the matter there is a loss in adopting a system under which telegraph operators can be dispensed with, as the necessity of getting a person who has had some training has heretofore tended to keep the standard of general intelligence higher than it otherwise would have been; but such a small amount of training is now accepted as satisfactory that operators as a class are not astonishingly high above other railroad employés; and there is nothing to hinder a manager from maintaining as high a standard as he pleases in hiring non-telegraphers. The Erie's book of instructions to enginemen concerning the interlocking signals is, in many respects, clearer and simpler than most circulars of the kind, and has features worthy of imitation; though we regret to see that the company has, if we may judge by the diagram, sacrificed correct signaling principles a little for the purpose, apparently, of saving the expense of an additional signal bridge. In placing a danger signal beyond the point at which the train must stop, the Erie will not be without respectable company, but such practice is, nevertheless, subversive of good discipline.

The most obstreperous and unreasonable union of railroad employés is the Switchmen's Mutual Aid Association, and the most obstreperous and unreasonable body of employés are the Chicago switchmen. They have terrorized the railroad companies until they get probably the higest wages that are paid in the world, when all the elements that go to determine a reasonable rate of wages are considered. But, what is worse, they are able to overthrow discipline and imperil business pretty much at their pleasure. This situation has come about because it has been extremely difficult for the railroads to fight the switchmen at Chicago. The public incovenience of stopping yard work there is immense, and the railroads have shrunk from it, especially as they could not agree to back each other in a fight. Of course such a state of things can have but one end. The exactions of the men will increase until the roads are obliged to fight to the death and the men are beaten. The interests of the great mass of the public, when carried out to the end, must require that the discipline and management of the railroads shall rest in the hands of the responsible officers; so, in the long run, the men must be beaten unless they too recognize the rights and interests of the general public. This lesson all trade-unions and farmers' alliances and trusts of all sorts must learn sooner or later. If they do not learn it and act on it they cannot live long. Unfortunately they have to learn the lesson, as the rest of humanity learns most lessons, by hard knocks and more or less suffering—by experience, in a word. In the case of the railroad men's unions the first cost of furnishing this experience falls heavily on stockholders, and a little less directly on the public served; and it takes a good deal of courage for the officers of any one road to fight for a general principle when they are not sure of the support either of their stockholders or of the public, and when they are quite sure that their competitors will improve the chance to tak away traffic. To temporize is inglorious, and in the end costly, but it is safe for the time, and so they temporize, and the men are misled by easy victory. In the case of the Chicago switchmen one railroad company seems to have mustered up courage to take possession again of its own yards, and run them on business principles. This is a cause for congratulation, and it is to be hoped that the Northwestern's spirit will be infectious. The officers of the Switchmen's Association are reported as still feeling very warlike, but the latest reports indicate that the traffic of the road is running smoothly, having suffered no great interruption.

A rear collision that happened on May 13 three miles west of Bound Brook, N. J., is worthy of special note by reason of the fact that it was on a road which runs perhaps the fastest trains in America (if indeed they are not in some respects the fastest in the world), while yet it does not adopt one of the most important time-tested safeguards—the block system. The train leaving Jersey City at 4:12 p. m. (which is scheduled to run 89 miles in 117 minutes, including several stops, and to make the 27 miles between Bound Brook and Trenton Junction in 28 minutes) ran into a freight train ahead of it, which was not set off quite soon enough. A brakeman went back from the freight, but says the passenger runner disregarded his signal. We have not the exact particulars, and therefore cannot say how much the brakeman himself or his conductor may have been to blame; but that point is not material to what we wish to say here. The passenger engineman is the only person reported seriously injured, and there may be those who will say that discussion of fine points of discipline should be deferred to a more opportune time—until a really serious collison occurs. Past experience partly justifies this view, for it has shown that, generally speaking, a disaster of a decidedly unusual, if not a horrible, character must occur before a thoroughly active interest can be aroused in remedial measures. But however this may be, a lesson of the present case is that conductors will miscalculate, brakemen will be slow and enginemen will relax vigilance where trains run 75 miles an hour, as well as where speeds are more moderate. Very likely the men on this line are as intelligent and alert as the average on our best roads; and New Jersey railroads enjoy in large measure the benefit of that great "safety device" that has so favored the Western roads, a country favorable to level tangents; but still men will forget. The point that the public should insist on is that the various stock arguments against spending money for a block system do not apply in this case. To say that past experience with the flagging system justifies its continuance as a protection against rear collisions is fallacious, because past experience has been with trains running at much lower average speed. To argue that income is small or that expenditures are more urgently demanded in other directions is absurdly unreasonable where a road runs trains at the highest speed, furnishes the best cars and runs 15 or 20 passenger trains each way daily. The public does not really demand ten trains a day unless they are the safest possible trains. In a new country people may be glad to ride on shaky trestles and to assume various other risks rather than go on horseback; but where they already have fair railroad facilities they desire improvement in quality rather than in quantity. The highest quality of passenger transportation implies the highest degree of safety, and an element of this is the arrangement of a series of *fixed points* where the engineman may look for his danger signals, instead of being compelled to strain his eyes during every foot of his journey: this means the block system. And a sufficient warrant for demanding it in this case is found in the combination of three conditions, viz.: (1) high speed, (2) heavy cars and engines, and (3) numerous trains.

The English accident reports for the last quarter of 1890 being somewhat voluminous, only a portion of our summary was printed last week, and a further installment will be found in this issue. The most noticeable deficiencies observed by an American studying the English government reports for instruction are those resulting from the necessity, under which the inspectors labor, of taking into account the limitations imposed

by universal English practice. For instance, a freight collision occurs which might readily have been prevented by setting a few brakes on the cars, but as practically all the cars have no brakes worth mentioning, and as their loads are such that it would not be easy for the trainmen to set the brakes, if there were any, the inspector says nothing about the great desirability of having a good brake on every vehicle. Another point which has apparently been settled by practice, and which is of more immediate consequence to American readers, is that concerning the methods of protecting the rear of a train which is already under block signals. Those who have followed this subject are aware of the difficulties connected with the flagging system of protection and of the new difficulties sure to be met with when the block system is introduced along with the flagging system. While the English clearing-house code—used, like our standard code, by a majority of the roads—requires the flagman to protect his train in precisely the same manner when running under the block system that he would if there were no fixed signals whatever, in practice he does not do it; and, moreover, the government inspectors do not criticise his course. As the inspectors are constantly demanding the enforcement of rules concerning some very fine points, we inquired the reason for the silence of a recent report on this point, and the answer is worth noting. It is simply that the men do not and cannot carry out the rule. In other words, it is not the custom on any road, and the inspectors believe that the traffic could not be carried on if the rule were enforced. In the case in question a freight train had been standing for half an hour at the home signal at the outgoing end of a block section about two miles long, when it was run into by an empty engine at the rear, and a man was killed. The brakeman might have put down torpedoes a half mile back just as well as not, as he had 34 minutes in which to do it, but he made no attempt whatever to carry out the rule, and the inspector passes no censure upon him for thus ignoring it. In this case the runner of the colliding engine seems to have been wholly or partially asleep, so that a torpedo might have stopped him when the visual signal did not; but still the brakeman is not blamed. As American brakemen are required to follow just such a flagging rule as that in force over there, and to continue observing it regardless of the introduction of a block system, it may be worth while to inquire what will be the effect on discipline. The impracticability of this rule is just as evident on American roads as anywhere, but the standard code says: "If a rule cannot be enforced it ought not to exist." This precept is probably not found in the English code, and we are not responsible for their inconsistencies, any way; but it is binding on those who use the standard code, and ought to be heeded by every one, whether his code be standard or unstandard.

Doubtless the aim of many managers in perpetuating a rule which they know cannot be consistently enforced is to have it available when it can be enforced. But this at once violates the precept above quoted. If it is desired to have a brakeman go back with torpedoes when he has a half-hour to do it in, but to omit this precaution when it is unnecessary and he has not time to do it without delaying his own or another train, the only rational plan is to allow him or the conductor some discretion in the matter. There is no question but that flagging sometimes does more harm than good. The stopping of a following train to pick up a flagman often may introduce an additional element of danger, and it is many times done at points where a strict construction of the rules would require the flagman of *that* train to go back to flag the third train, so that the delaying of other trains is by no means an imaginary evil; and where the brakemen of a passenger train are made to do everything they can to assist in making time and for the convenience of passengers, the frequent depletion of the crew for flagging purposes materially impairs discipline. The flagging rules have, after much labor, been brought down to a fair degree of simplicity, and it is true that plain and simple regulations permit the employment of less skillful men than would otherwise be possible, other things being equal; but it will not be safe in this case to assume that simplicity of rules covers everything, especially so long as there is any possibility that it has been attained by a sacrifice of consistency. The fact is that *both* plain rules and intelligent men are needed. To protect trains from rear collision without a block system either the trainmen must be allowed considerable discretion about flagging or else trains must be often delayed. No one wishes to adopt the latter alternative, and so the former is the common resort; but why not plainly set this forth in the rules? What superintendent has not been practically cornered by conductors or brakemen when investigating this subject in connection with collisions? By asserting his authority the superior can get the better of the argument in a case like this, but this is an unsatisfactory way of meeting the issue, especially when there is clearly a better way. The superintendent is unable to properly administer discipline strictly by the rules, simply because the rules are too rigid to meet all the varying conditions that the trainman meets; but if discretion is to be virtually permitted, the rules should be changed to conform to the actual standard, even at the expense of an extra page or two. While it is possible to set forth a certain interpretation of the rules every time a question comes up, and to compel all the men who are conversant with that case to adopt such interpretation, there are still the great majority of the men *not* interested in that particular inquiry who must be considered; and what better way to get the matter before them than to publish, for their benefit, the results of inquiries about accidents and other irregularities? This has been done to a limited extent, and if consistently followed would lead to clearer rules after a while; and the clearer the rules the more completely can disobedience be repressed.

The Authority of the Interstate Commerce Commission.

In looking over the docket of the English Railway and Canal Commission, one cannot fail to be struck with the small number of cases which have come up for decision. There were 28 in all, while in the corresponding report of the Interstate Commerce Commission there were 149. To some extent this is due to different conditions in the two countries. The English law is more settled: there are fewer questions of interpretation which need to be taken up from the beginning. But the very fact that such questions have to be faced in this country should make the Interstate Commerce Commission cautious about extending the sphere of its jurisdiction any further than it is compelled to. It does not seem as though the Commission had always shown this caution.

Take the decision in the case of John P. Squire & Co. vs. Michigan Central *et al.** "The provision of the third section of the Act to Regulate Commerce prohibiting carriers from making or giving any undue or unreasonable preference . . . . not only applies to relative rates on one description of traffic shipped to or from competing localities, but also to relative rates on differently described articles which are competitive in the same market." In one sense, we have no fault to find with this principle. It represents a standard to which railroad tariffs ought to conform just as far as possible. What we feel doubtful about is the wisdom on the part of the Commission in defining the law in such a way as to scatter its fire, instead of concentrating its attention upon those evils which are clearly within the application of the law, and large enough to keep its hands full.

The one evil which makes more trouble than all the rest put together is personal discrimination. Business will adjust itself to anything else; it will not adjust itself to that, except by the process of driving the better class of men to the wall. It is a hard task to check personal discrimination—without the aid of pools, a very hard one; but, as the experience of England shows, not an impossible one. The act of 1854 prohibited giving preferences. The courts took the act as they found it. They did not attempt to define the prohibition broadly or to give questionable meanings to the word. They simply took it in its narrower sense, and enforced it. By not trying to do everything they succeeded in doing something.

With us the case has been just the reverse. During the first few months after the passage of the Interstate Commerce Act, there were, it is true, fewer personal discriminations than before or since. But as the Commission widened the application of the act, and extended it to more doubtful cases, the obedience in the most important feature became less and less strict. The powers of the Commission are so limited and their requirements so large, that evasion of the law is an almost inevitable result.

The Commission does not see "how the cutting of rates by the Grand Trunk and the Baltimore & Ohio affects the question" of relative rates for different products on the Michigan Central. It at any rate affects the authority and power of the Commission to say what those rates shall be. If the Commission cannot defend the Michigan Central, the Michigan Central is likely to try to defend itself, and not listen with any great respect to the suggestion that such methods of defense are unlawful.

While Mr. Stickney's picture of the working force of the Commission as "five members, a secretary and a type-writer" is overdrawn, it is also true that the force at its command is quite inadequate to the work it is undertaking. It has a choice between trying to do a little, with a fair chance of success, or trying to do a great deal, without any such chance. There is constant danger of its choosing the latter alternative.

* *Railroad Gazette*, April 24, p. 296.

Cost of Operating Street Railroads.

The Superintendent of the Census, in Bulletin No. 55, presents the results of an investigation by Mr. C. H. Cooley, a statistician of the Interstate Commerce Commission, into the cost of operating street railroads by horse, cable and electric power. Mr. Cooley frankly admits that the data from which his results are obtained are too limited in amount, and those in regard to electric roads either too imperfect or relating to too undeveloped a state of that kind of traction to be at all conclusive as to the relative advantages of the different methods of traction. It is to be noted, however, that the favorable showing made by the electric roads is likely to be increased when roads of equal traffic with the cable and horse roads are developed. *The Commercial and Financial Chronicle* has, by a further investigation as to what roads were used as a basis for the calculation, shown that the horse roads selected were taken somewhat arbitrarily. In New York, for instance, only the Dry Dock and the Belt roads were taken in, such important all horse roads as the Broadway, the Second, Fourth, Sixth and Eighth Avenue, and the Twenty-third street roads being left out altogether.

The aggregate passengers per annum of the 30 roads selected by Mr. Cooley for comparison, horse, cable and electric, which are designated by numbers only, is, according to the *Chronicle*, 300 millions against 383 millions of street railroad passengers per annum in New York State alone.

What the electric and cable roads are which are selected by Mr. Cooley, does not appear at all. They all date since 1884, however, with the exception of one cable road, which goes back to 1877. All the electric roads date since 1887. The collective traffic statistics are as follows:

TABLE A.

Operating expenses.	Ten cable roads. (Cents.)	Nine electric roads. (Cents.)	Thirty roads operated by animal power. (Cents.)
Oper. exp. per car mile	14.12	13.21	18.16
Oper. exp. per passenger carried	3.22	3.82	3.67

TABLE B.

Traffic.	Cable roads.	Electric roads.	Roads operated by animal power.
No. of passengers carried per car mile	4.38	3.46	4.95

TABLE C.

Cost and traffic per mile.	Cable roads.	Electric roads.	Roads operated by animal power.
Total cost of road and equipment per mile of line (street length)	$350,324.60	$46,697.59	$71,387.38
No. of passengers carried per mile per year	1,355,935	222,648	596,563

TABLE D.

	Cable roads. (Cents.)	Electric roads. (Cents.)	Roads operated by animal power. (Cents.)
Oper. exp. per car mile	14.12	13.21	18.16
Interest charge per car mile at assumed rate of 6 per cent.	6.79	4.35	3.55
Sum of oper. exp. and interest.	20.91	17.56	21.71
Oper. exp. per passenger carried	3.22	3.82	3.67
Interest charge per passenger at assumed rate of 6 per cent.	1.55	1.26	0.72
Sum of oper. exp. and interest.	4.77	5.08	4.39

It is noticeable in the above that the cable roads carried more than twice as many passengers per mile of road as the horse roads, indicating that cable roads of rather exceptional density of traffic were taken as compared with the horse roads cited. On the other hand, the electric roads used in the comparison do not compare favorably in density of traffic with the horse roads, and so far as any results are deducible from these limited statistics, they certainly make very much in favor of the electric roads. It is easy to see that if the passengers per car of the electric road were equal to those on the horse road, the expense per passenger would have been reduced from 3.82 to about 2.67 cents, or below the cable cost. Furthermore, if the increase of passengers thus effected with but little increase of stock or plant is taken into account in the table in which interest on construction cost enters, the cost per passenger mile would have been reduced to about 3.55, again much less than either of the other methods of traction. The most striking thing indeed in Mr. Cooley's results is the unfavorable showing of cost of operating for cable roads when interest on the plant is considered. At first sight

it might seem that this was due to the steep grades over which these roads are operated, two of them having grades of 70 per cent. and 80 per cent. over lengths of 500 and 413 ft. respectively. This does not seem to be borne out by an examination of the details of operating cost, which show these roads as above the average, but not so much so as might be expected, except in the latter case, which has the highest operating cost per car mile.

Unfortunately the average gradient worked over is not given, nor the amount of curvature—making any equation of the comparative conditions impracticable. The same is true in all respects of the electric roads, which have much lower maximum grades, the highest being 12.5 per cent. The maximum operating costs per car do not coincide at all with the maximum grades. It is easy to see that where grades to be worked over are as steep as those on some of the cable and electric roads horse traction is impracticable, but where grades are moderate it does not appear from these statistics where the profit lies in putting in the cable. Thus the lowest cost per car given for a cable traction road is 9.39c. per mile, while the minimum horse traction costs 9.21c. and the maximum only 27.02c. On the other hand table *C* shows the average cost of cable roads per mile as five times that of animal roads. It is difficult to see a profit in cable traction under these circumstances.

Since the cable roads are not specified, it is impossible to say how fairly the roads used in the comparison represent average working. Some cable roads are reported to have been worked as cheaply as 8 cents per car mile, but statistics in regard to this are not available, and it is evident that even this figure would not change the apparent want of advantage in cable roads unless their cost has been enormously exaggerated.

Jay Gould's Rapid Transit Proposition.

Mr. Gould had apparently been waiting for the Commission to become somewhat hopeless as to the feasibility of rapid transit other than through the streets, to put forward the scheme for extending the present roads which was outlined in these columns last week, and which, if carried out in its entirety, would add nearly 50 per cent. to the Manhattan system in New York. His claims are judiciously large, so that after half of them have been pruned away he would appear to have been very much shorn, but in reality would get all he could hope for. In point of fact, if we once concede that elevated structures in the streets are the only practicable means of rapid transit in New York, part of these propositions appear really desirable. Considering them in reverse order, viz., beginning with the most undesirable, we have first the Boulevard scheme. This would involve occupying the finest thoroughfare in New York with an unsightly structure, whose advantages would be chiefly in Mr. Gould's ability to occupy the whole region west and north of the Park, to the exclusion of unpleasant rivals. The proposed Duane street cut-off from the Sixth to the Ninth avenue line would probably excite much opposition, and appears to be of little advantage, since it does not in the least relieve the Sixth avenue line on the most crowded part of its length, from Chambers to Fifty-third street.

The next in order seems to be the crosstown line from the Brooklyn Bridge via Centre and Canal streets, which would undoubtedly bring in grist to Mr. Gould's mill. It is not clear, however, how it would afford any relief to the crowded condition of the Third and Sixth avenue lines in the busiest hours, which is after all the nub of the whole situation.

Next we have the proposition to connect the Sixth and Ninth avenue lines by a cut-off through Carmine and Clarkson streets. This would undoubtedly be a great convenience to the New York public in the way of access to the railroad ferries, and would also be as great a convenience to the New Jersey people who visit shops and theatres in New York, as the last-mentioned line would be to Brooklynites. It would, however, only tend to still further crowd the busy section of the Sixth avenue road.

The proposition to put a road into West street to communicate with the Ninth and Sixth avenue roads via Fourteenth street is in this form very unnecessary, and is to be classed with the Boulevard scheme as a simple contrivance of the Manhattan to shut out any rivalry for the ferry business. If, however, this route were extended up Tenth avenue to Thirtieth street, it would offer a fine opportunity for the Vanderbilt interest to get an elevated New York line to the Battery, by which its suburban traffic could be carried directly down town; a passenger connection established with all the railroad ferries, and a freight line, without interference with the streets, to all the North River wharves and to its own downtown freight stations, increasing their capacity by making them double-decked. It would also open a connection from the ferries via Spuyten Duyvil to the New Haven road for through Eastern business, and would serve, to a certain extent, the whole north end of the island.

The proposal to put additional tracks into the Bowery is probably unobjectionable, inasmuch as the extension of the supplementary track on Third avenue to Chatham Square would surely give some relief to the pressure on the Bowery line, and it would not seem to inflict any further damage on the abutters. With a line on South street turning up Oliver or Catharine street to Chatham Square, over which all Second avenue trains should be run, it would certainly be a valuable improvement. The proposal, however, which seems pre-eminently judicious is that to run a road along the water front of the Harlem, from 155th street to Kingsbridge, as an extension of the Eighth avenue line. This would give an outlet to the Washington Heights region, now tied up for want of rapid transit. It should of course be raised sufficiently to allow access beneath it to the river.

If the city grants to Mr. Gould franchises for any of the above lines, which are in every sense open to competition, it is to be hoped they will be coupled with a requirement to move out of the Battery Park and make a continuous connection around the lower end of the island.

The Cost of Steel Rails.

The *Iron Age* lately published a table showing the cost, month by month, of coal, pig iron and steel rails for ten years, ending with Dec.,1890. The figures were taken from the books of a leading mill which ranks among the prosperous concerns of the country. This company produced its own coal and made the greater part of the pig iron consumed; but some of the pig iron used in rail-making is purchased, generally at a higher price than the cost of making, so that the cost of the pig iron shown in the table "cannot, of course, be taken as the basis of computations affecting the cost of rails." We have calculated the averages by years, from the tables of monthly costs *at the mill*, showing the average cost of coal, pig iron and steel rails for each year, and we add the ratio between the cost of rails and of the pig iron, and the average yearly prices of steel rails at works in Pennsylvania, as returned by Mr. Swank.

Year.	Average cost. Coal.	Pig iron.	Rails.	Ratio of rails to pig iron.	Average price.	Per ct. of cost to market price.
1881	$1.44	$26.11	$43.31	1.659	$61.12	71
1882	1.46	22.89	43.90	1.525	48.50	91
1883	1.29	18.97	35.51	1.889	37.75	94
1884	1.06	17.21	28.99	1.626	30.75	94
1885	1.08	15.74	27.24	1.730	28.50	96
1886	1.12	17.60	29.05	1.651	34.50	84
1887	1.11	18.21	30.28	1.657	37.12	82
1888	1.12	17.39	28.77	1.654	29.88	96
1889	1.14	15.26	26.07	1.708	29.25	89
1890	1.16	15.83	28.99	1.831	31.75	91
Av. for 10 yrs.	1.20	18.52	32.21	1.739	36.85	87

An inspection of the table will show that while the cost of pig has fallen, through the decrease in freight rates and improved furnace practice, of which so much has been written since Mr. Gayley read his paper before the Iron and Steel Institute, the ratio between the cost of rails and pig iron has been remarkably constant. This warrants the inference that improvements in rail mills have proceeded hand in hand with those in blast furnaces. A comparison of the price of Bessemer pig iron at Pittsburgh with the price of steel rails in Pennsylvania will show about the same ratios as given above, with rather larger variations, extremes running from 1.55 to 1.91.

These improvements in steel-rail mills have been made both by building larger mills, and on the lines laid down by A. L. Holley at a meeting of the Iron and Steel Institute in 1881: "The better adaptation of plant lay in more mechanical appliances and in more convenient appliances; in duplicate machines where there was danger of breakdowns; in large and convenient spaces for the men to work in; in short, in providing for all the operations of steel-making."

The relation between the cost and price has not been so regular. In 1881 the difference between the mill cost and the average price in Pennsylvania was $17.81, but in 1888 this difference was only $1.11, and a comparison of monthly costs with Mr. Swank's tables of average monthly prices will show a good many months in which the profits were on the wrong side of the ledger. Moreover, the tables are probably averaged from the market quotations, whereas the average figured from actual sales would show a lower price, as the large sales are all made at the lowest rates.

Vice-Chairman Donald of the Central Traffic Association has been sending out a number of sample identification cards, made by the International Identification Card Co., of Chicago, to the various lines in the Association, with a view to securing their co-operation toward the adoption of the device in connection with the issuing of mileage books. The card is made up in convenient book form for the vest pocket, and bears a photograph of the person to whom issued, together with his name, profession or occupation, place of business and residence, and registered number. Substitution of a spurious photograph is guarded against by the indented seal of the company, overlapping one corner. The card is of "parchment" paper, with safety tint to detect alterations of writing, and in addition to the photograph, it bears the signature of the owner, attested by a Notary Public, or other competent officer, under seal. Space is also provided for the certificate of the secretary of any lodge or organization of which the person may be a member; also space for mention of the company in which insurance is carried, and other information to be used in case of accident. The plan under consideration contemplates the adoption by the associated roads of an agreement to issue all mileage books iron-clad, with signature subject to identification by means of one of these cards. One card could be used over any number of roads, though it would, of course, be better to have the ticket (contract) printed on the same sheet. The general idea is viewed with favor by many railroad officers, and numerous bank officers and postmasters have already expressed willingness to pay money to strangers identified in this way. If the plan were carried out, it would undoubtedly tend strongly to do away with the traffic in mileage books now carried on by the scalpers.

The decisions with regard to through routes, of which the New York and New England is the last and most important case, are a good deal like those on cases which came up in England after the act of 1854. But there is this radical difference, that the English law encouraged arrangements of almost every kind, and made no attempt to prohibit pools; while the American law encourage some arrangements and tries to prohibit others. It compels a road to make arrangements for through traffic with a connecting line, whether it wants to or not; but it forbids a road to make arrangements with others to prevent rate-cutting by division of traffic. We believe in having through traffic facilities furnished as freely as possible; but the development of these facilities is simply a part of a large tendency toward unification of management. It seems like folly to insist on the part, and try to stand in the way of the development of the whole.

The Central Traffic and Trunk Line roads have voted by a large majority to make no reduction in east-bound grain rates, though shipments by lake are heavy and those from Chicago by rail very light. The reports state that this result is owing to the fact that the roads east of Buffalo and Erie control the situation; these roads get a good share of the traffic even if it comes by boat through the lakes, and naturally care but little how the grain leaves Chicago. But if the trunk lines have exerted any influence over the votes of their Western connections it is in consequence of ownership in them, and the influence is therefore conservative. The Western roads probably decided to maintain rates not merely because their Eastern connections or masters desired it, but also because the interior and local traffic, which is sure to go by rail, and which is all the time growing in importance, brings in greater net earnings at existing rates than could probably be got from this and the competitive grain combined if rates were reduced.

The Cleveland Car Service Association has issued a new code of rules, the principal alteration being a precise statement of the kinds of freight exempted from regulations. Cars containing live stock, freight in transit destined through over rail or water lines not held for orders, or for disposition by consignee, shipments which are to be unloaded in freighthouses, and company material are exempt, but the regular charge applies to cars detained at any point within the Association's territory awaiting bills of lading, as well as cars detained for want of proper shipping instructions or by reason of improper, unsafe or excessive loading. Coal intended for lake shipment is the principal commodity excepted, and as some of this coal is originally consigned to Cleveland proper there is considerable complication. The New York and New Jersey Car Service Association also exempts coal which is to be shipped by water. This is manifestly the only possible way at present of adapting demurrage rules to the New York terminals, where acres of ground are always covered with loaded coal cars.

TRADE CATALOGUES.

Berlin Iron Bridge Co., East Berlin, Conn.—This company has issued a new and enlarged catalogue describing the iron bridges, iron roofs, iron buildings, turntables and other structures made by it, together with a brief essay on the progress of the art connected with its business and a list of parties for whom work has been done. This company is especially liberal in its use of engravings, and the book before us contains about 100 large illustrations, showing every variety of work done by the company. These pictures are beautifully executed, and enable one to get a very good idea of the different kinds of structures without reading the text, though the latter in each case gives clear and concise information about the kind of structure illustrated.

THE SCRAP HEAP.

Artesian Wells for Irrigation in South Dakota

The subject of artesian irrigation is the uppermost topic in the minds of people in South Dakota, and if finally successful, means great prosperity to the railroads and every other interest there. A few years ago the idea of irrigating land by artesian wells there seemed impossible, but this winter a law was passed by the legislature of the state allowing twenty or more property owners to apply to the state authorities for an artesian well in any district. County bonds are issued to dig the

wells and the water is leased at so much a year. The rental does not exceed the amount of interest on the bonds. Applications for wells are coming from all parts of the artesian district. The state in a measure directs the location of the wells, so that the greatest amount of good can be got from each well. Southern Dakota will this year invest upwards of $200,000 in these wells. A farm in which a well is located must deed one acre about the well to the township, and a right of way through the farm so that the water can be delivered to other farms.—*Exchange.*

In the Life of a Bridge Builder.

On last Saturday, while Jolly Bros., of Pittsburgh, who have the contract for the stonework on the piers and abutments of the new highway bridge of the Wheeling Bridge Co. at Wheeling, W. Va., were putting the last coping stone on the channel pier, the boom of the derrick broke, but not until the stone had been raised above the pier. The stone dropped onto the top of the pier, the hooks pulled loose and the boom of the derrick fell, leaving the chief engineer, Mr. J. K. Jolly, and four workman on top of the pedestal nearly a hundred feet above the water. The workmen put the stone in position and finished the pier, but it took nearly 24 hours to get them down from their high perch. A rope was thrown to the top of the pier, and they made it fast and climbed down.

LOCOMOTIVE BUILDING.

The New York, Chicago & St. Louis is receiving five new locomotives from the Brooks Locomotive Works.

The Schenectady Locomotive Works delivered two heavy engines to the Maine Central this week.

The Cleveland & Canton is reported to be about to place an order for seven new locomotives.

The Rhode Island Locomotive Works are building six 10-wheelers for the Mexican Central, compounded on the Johnstone principle. This system is explained at some length in another column of this issue. The Mexican Central has one of the Johnstone compounds now in service, and will change 52 of its engines to the same system as rapidly as possible. The 10-wheelers building have cylinders 14 in. and 29½ in. × 24 in.; drivers, 56 in.; weight on drivers, 105,000 lbs.; boiler, 60 in. smallest diameter.

CAR BUILDING.

The Loyal Hanna Coal Co., of Philadelphia, let the contract this week for building 250 coal cars.

The Gilbert Car Co. and other Eastern car companies are bidding on 40 passenger cars for export to Brazil.

The Philadelphia & Reading has received 3,000 coal cars of 25 tons capacity each since Jan. 1 from the Pullman Car Works. Probably 1,000 more cars will be added before August.

The Western New York & Pennsylvania has a contract with Pullman's Palace Car Co. for a number of passenger cars which are to be delivered in about six weeks.

The branch of the Lafayette Car Works, at Lafayette, Ind., will soon be removed to Lima, O., it is thought, and united with the works there under the title of the Ohio Car Manufacturing Co., and a department for the manufacture of passenger cars added.

The Pittsburgh & Lake Erie has placed an order with the Youngstown Car Mfg. Co. for 500 gondola cars, which will keep the works busy for three months.

The Denver & Rio Grande has received the first installment of eight new Pullman palace cars. The new cars contain 12 sections, with a smoking-room in one end and a parlor for ladies in the other. The interior is finished in cherry.

The Brooklyn-Union Elevated road has received 20 new passenger cars from the Detroit shops of Pullman's Palace Car Co. These cars are for service on the Fifth avenue branch. The transverse seats have high backs, similar to the new cars of the Manhattan Elevated. The cars are very handsome, and equal to any of this style built by Pullman.

At the Buffalo shops of the Wagner Palace Car Co. about 1,250 men are being employed. The shops are crowded with work. Twenty cars of elaborate design are being built for general service in the Wagner lines, and four sleepers to be run in the new Chicago and Boston New York service over the Lake Shore and New York Central roads are nearly completed. On account of the lack of shop-room, a number of dining and buffet cars for the same service are being built at other shops. For the Adirondack & St. Lawrence four passenger and two combination buffet, smoking and baggage cars are being built. Two of the coaches will be finished in natural mahogany with gold ornamentation.

The Atchison, Topeka & Santa Fe has recently put in its service two Pullman sleeping-cars built expressly for the road. They are to run between Chicago and St. Louis. Each car is 60 ft. 10 in. in length and divided into five parts; a drawing-room, eight sections, two double and one single private compartments, buffet and the usual smoking and toilet rooms. All the compartments contain two berths, one upper and one lower.

BRIDGE BUILDING.

Allston, Mass.—The special commission appointed under the Massachusetts grade-crossing law has recommended the construction of an overhead bridge at Allston. The cost of the bridge and land damages will amount to $55,000. The commonwealth pays 25 per cent., the city of Boston 10 per cent., and the Boston & Albany road the balance.

Baltimore, Md.—The new Light street drawbridge across the middle branch of the Patapsco River was opened last week. The city council appropriated $80,000 for the bridge in May, 1889, and work was begun in October. Work was stopped on April 30, 1890, the appropriation of $80,000 having been expended in rebuilding the bridge from the Anne Arundel County shore to the old drawbridge. In June, 1890, a new appropriation of $80,465 was made for building an iron swing-bridge to replace the old draw and to complete the bridge proper to the Baltimore City side. The piles are driven 65 ft. to the bed of the river, and cut off 15 ft. 6 in. below mean low tide. Upon the piles a grillage of 12 × 12 Geogia pine, 29 ft. square by 14 ft. high, containing, with its coffer-dam, over 102,500 ft. of lumber, was sunk for the pier of masonry. This pier is of marble, with a granite coping, and upon it swings the iron bridge, which was built by the King Iron Bridge Co., of Cleveland, O., for $20,746. This swing weighs 458,000 lbs., and is 218 ft. long, giving two channel ways of 84 ft. 3 in. clear opening. The total length of the bridge is 4,531 ft. It has a driveway 26 ft. wide and a raised footpath 6 ft. wide.

The Mayor has signed the ordinance providing for the building of the North avenue bridge.

Barboursville, W. Va.—The county commissioners of Cabell County have let the contract for a new iron bridge over the Four Pole River.

Birmingham, Ala.—The City Engineer is preparing plans for a new bridge which it is proposed to build from Eleventh to Fourteenth streets, on Second avenue.

Buckley, Wash.—The County Commissioners of King and Pierce counties, Wash., have decided to erect a bridge over the White River at Buckley. The main span of the bridge will be about 100 ft. long, with approaches of probably 350 ft. It is estimated the cost will be about $3,000.

Canyon City, Tex.—An iron bridge will probably be built by the town across the creek above the cañon at this place.

Denver, Col.—It is stated that proceedings will probably be brought at an early date to compel the Union Pacific to build a viaduct over its tracks at Fortieth street, to connect Elyria and East Denver. The City Council of Denver may appropriate $15,000 for the project.

Elkins, W. Va.—The new steel bridge building by the West Virginia Central & Pittsburgh at Elkins is almost completed and will be ready for use in about three weeks. The channel span was finished last week and is 147 ft. 7 in. in length.

Elkview, Pa.—The Commissioners of Chester County contemplate the erection of a bridge on the line between Penn and Upper Oxford townships, one mile from Elkview.

Hawk's Nest, W. Va.—The Chesapeake & Ohio Railroad has contracted with the Phœnix Bridge Co. for a new steel bridge over New River at Hawk's Nest, W. Va.

Jennersville, Pa.—It is reported that the County Commissioners will erect a bridge over Big Elk Creek, between Jennersville and Forrestville.

Knoxville, Tenn.—An ordinance has been passed by the City Council appropriating $10,000 toward the construction of the Gay street bridge.

Marriottsville, Ind.—The Commissioners of Howard County have voted to join with Carroll County in the construction of an iron bridge over the Patapsco River at Marriottsville. It will be of iron, upon substantial masonry.

McKeesport, Pa.—The bridge built by the McKeesport & Duquesne Bridge Co., across the Monongahela River between McKeesport and Duquesne, was formally opened May 12. Gustav Lindenthal, of Pittsburgh designed the structure. Work was begun on the foundation May, 1890. The total length of the structure is 1,105 ft. Two spans are 223 ft. in length and two are 229½ ft. long. The width is 23 ft. and the height 35 ft. It contains 600 tons of iron, 600 tons of lumber and 5,000 yards of masonry. The iron work was done by the Pencoyd Bridge Co. of Philadelphia.

The Pittsburgh, Virginia & Charleston Railroad is also at present building a bridge across the river at McKeesport, and in a few weeks it will be ready for use, when that road will enter McKeesport from Duquesne.

Niagara Falls, Ont.—A petition has been presented to the Canadian House of Commons from Sir Donald A. Smith, W. C. Van Horne, R. B. Angus, T. G. Shaughnessy and G. M. Clark, of Montreal, C. R. Ham, of Boston, and R. M. Wells, of Toronto, asking for incorporation as the New York & Ontario Bridge Co., with power to build a railroad bridge across the Niagara River, near the town of Niagara Falls, and to amalgamate with the bridge company incorporated in the State of New York.

Paisley, Ont.—Tenders will be received by S. McArton, Paisley, up to May 30, for the construction of an iron bridge across the Saugeen River at the village of Paisley, consisting of either one single span of 190 ft. or of two separate spans of 95 ft. each. Tenders will also be received for iron supports for the bridge in lieu of masonry.

Pecos, Tex.—The Southern Pacific is reported to be receiving bids for the iron work for the high bridge over the Pecos River, on the new line from Pecos. Ricker, Lee & Co., of Galveston, Tex., are building the masonry work. The bridge is 334 ft. high, 1,900 ft. long, with 24 piers of masonry. It is being built across the Pecos River, 300 miles west from San Antonio. The banks of the river are solid rock and 200 ft. perpendicular. Everything has to be lowered down by derricks.

Pittsburgh, Pa.—Proposals will be received by Theodore Cooper, 35 Broadway, New York, for constructing the three piers, the abutment and the approaches of the new Sixth street bridge, Pittsburgh, Pa., up to June 10 and plans and proposals for the superstructure up to July 8. The spans will be 445 ft. in length. General specifications and plans for the masonry can be seen at New York, or at the office of the Allegheny Bridge Co., Pittsburgh.

Plans have been prepared by the city engineer for the proposed bridge for the Schenley park entrance. The Larimer avenue bridge is to be 650 ft. long, and where it crosses the deepest part of the ravine will be 115 ft. high. The Schenley park bridge will cross from Bellefield avenue below Forbes to the park, and is to be 600 ft. long. At the highest point it will be 100 ft. high.

Randallstown, Md.—A new bridge will probably be built over Brice's Run, on the Randallstown Road. W. H. Shipley, Towson County, is Bridge Superintendent.

Ravenswood, W. Va.—The County Court of Jackson County will soon ask for bids for the erection of a highway bridge over the Poco River near Ravenswood. The bridge is to be 300 ft. in length and have a 40-ft. roadway.

Saginaw, Mich.—The City Engineer has recommended that the new $52,000 iron bridge be located at Center street, crossing the river to the intersection of Adeline street. The present charter provides that the structure be built from Perry street to Cambrey street.

Snohomish, Wash.—The City Council has accepted the plans and specifications prepared by the San Francisco Bridge Co. for an iron drawbridge across the Snohomish River, and have advertised for bids on the work. The bridge will cost about $15,000.

Steubenville, O.—The County Commissioners of Jefferson County, O., with headquarters at Steubenville, have contracted for the building of eight new highway bridges over several streams in that county. The aggregate length of these bridges is about 500 ft. They are all to be of steel, with stone abutments.

Yuba County, Cal.—The Yuba County supervisors will receive bids with plans and specifications to build a bridge across Dry Creek up to July 6.

RAILROAD LAW—NOTES OF DECISIONS.

Powers, Liabilities and Regulation of Railroads.

In Wisconsin trustees in possession of a railroad, and of a dock and warehouse at the terminus of such road, had certain goods delivered at the dock to be shipped by a lake line, over which they had no control, and in the earnings of which they had no interest. On receiving the goods, they gave a shipping receipt, providing that their liabilites should cease at their depot at which freight was to be delivered to another carrier, and, "for all loss and damage occurring in the transit of said packages, the legal remedy shall be against the particular carrier or forwarder only in whose custody the said packages may actually be at the time of the happening thereof, it being understood that the trustees * * * assume no other responsibility for their safe carriage or safety than may be incurred on their own road." The Supreme Court decides that neither the trustees nor the road were liable for damages to the goods while in transit on the lake.[1]

In Colorado the Supreme Court holds that where a city, by its ordinance, grants to a railroad company the right of way for its tracks through certain streets, and there is nothing in the ordinance as to the width of the tracks, the company will not be enjoined at the suit of owners of abutting property from changing its track from a narrow to a broad gauge.[2]

Congress in 1864 granted to Iowa for the purpose of aiding in the construction of a railroad from Sioux City to the Minnesota state line, and from a point on such road to South McGregor, every alternate section of land for 10 miles from such roads not otherwise disposed of, with indemnity for such disposed-of land. The former road was built, except a part where all the granted land had been previously sold. The Federal Court rules the grant as was proportioned to the part of the road that was built.[3]

In the Federal Court it is held that the Missouri statute of 1889, which imposes on companies carrying goods "by express on contract with any railroad or steam-boat company," a tax on their "receipts for business done within this state" is not an interference with interstate commerce, nor does it deprive the company of the equal protection of the laws, or constitute inequlity of taxation, since the state has a right to tax different kinds of property in different ways.[4]

In Michigan the Supreme Court decides that the statute of 1889, fixing maximum rates of passenger fare upon railroads according to a classification based upon the gross annual passenger earnings, is not in contravention of the provision of the fourteenth amendment to the constitution of the United States, which declares that no state shall deprive any person of his property without due process of law, or deny him the equal protection of the laws.[5]

The plaintiff claimed under an act of Congress of 1857, which granted land "to the territory of Minnesota" to aid in the construction of a railroad whose terminus was to be some point "between the foot of Big Stone Lake and the mouth of Sioux Wood River." Prior to the passage of this act, and on Feb. 26, 1857, Congress had passed an enabling act for the proposed state of Minnesota which so located the boundary that the terminus of the road might be within or without the state. The terminus of the road was fixed at a point on the boundary line. The land in controversy lay within the territory, but was beyond the boundary of the proposed state. The Supreme Court of the United States holds that the grant was none the less effectual to pass the land, which in other respects was within the prescribed limits, becausethe railroad was built wholly within the state of Minnesota while the land lay outside of it and in the adjoining territory.[6]

Carriage of Goods and Injuries to Property.

In Texas, it is laid down by the Supreme Court that a shipper having agreed to assume all the risk of delay caused by any mob or strike or threatened violence, he cannot recover for delay caused by a strike of such a size as to require the military forces to overcome it.[7]

In Georgia the Supreme Court rules that a carrier is liable for goods lost by the act of God after its refusal to deliver to the consignee on presentation of the bill of lading, though the goods were marked by number only, and the delivery was refused because the way bill giving the name of the consignee had not been received when the demand was made, and the contract exempted the carrier from liability for wrong carriage or delivery of goods marked by initials or numbers.[8]

In Virginia the Supreme Court holds that where a contract for the transportation of goods over connecting lines of railroad is made with one company as the agent of the other, and the latter company transports the goods and collects the freight thereon, it cannot, when sued for injury done to the goods by its servants, deny the authority of the other company to make the contract for it.[9]

In Illinois the Supreme Court rules that where a railroad receives freight to be forwarded to a point not on its line, the fact that it requires from the shipper a guaranty of payment of through freight is not conclusive that it undertakes the responsibility of delivering the goods at the point of destination.[10]

In Indiana the Supreme Court holds that the act of a railroad company in starting a fire on a bed of peat, upon which its track was laid, at a season of great drought, is a positive wrong, which renders it liable for injury to adjacent property.[11]

Injuries to Passengers, Employes and Strangers.

In Texas a train stopped on a dark night away from the platform, and a passenger's station was called. He was told by the conductor to hurry, as he would be carried by if he did not. So urged, he stepped from the car, and fell several feet into a pile of wood. Held by the Supreme Court to be negligence for which the company was liable.[12]

In Virginia the accident occurred at night, during a snowstorm, while it was intensely dark, and the platforms of the cars were covered with snow. Plaintiff, a

woman, was unattended, and was incumbered by heavy clothing and parcels. There was no platform at the station, and defendant's servants, though present, rendered plaintiff no assistance. The Supreme Court rules that it was not error to charge that if there was no platform or other proper landing place at the stopping place, and defendant's servants rendered plaintiff no assistance in alighting, and if for want of such landing place and assistance plaintiff was injured without fault on her part, she could recover.[13]

In Texas the Supreme Court rules that where a workman voluntarily uses defective machinery with knowledge of the danger, he assumes the risk, though the use of the machinery is not necessarily dangerous.[14]

In Alabama the Supreme Court holds that an employer cannot provide that his employés shall look after and be responsible for their own safety.[15]

In Michigan the plaintiff was injured by the derailment of the train of which he was engineer, from running into a partly open switch. About a year before the switch had been abandoned, the lights taken down, and the rails spiked. The rules required engineers not to run over 15 miles an hour, in passing a switch which was in daily use. Plaintiff was running 45 or 50 miles an hour. Plaintiff's evidence was to the effect that he did not know of the reopening of the switch, and that if there had been lights on it, he could have seen them in time to prevent the accident. The Supreme Court rules that, if this was the case, the negligence of the company in not having lights was a concurrent cause of the accident, and plaintiff could recover, though the switch was left open by a trespasser or fellow-servant.[16]

In Michigan the Supreme Court holds that a railroad is bound to furnish its employés reasonably safe locomotives and appliances and a competent engineer and fireman, but not the best men or machinery which can be secured.[17]

In Georgia a "swage" in a railroad shop had become battered and burred, by reason of which a flake of iron was knocked off, and struck in the eye of an employé, who had gone to the shop to get a bolt needed in his work. It was shown that the implement was in "average condition," though one witness testified that it was not proper for use, and should have been repaired. The Supreme Conrt rules that there was no evidence of negligence.[18]

In Alabama the Supreme Court holds that the question whether the railroad company was negligent in not raising a low bridge above the danger line depends on the degree of inconvenience and injury the public or adjacent property owners would suffer by the change, but not on the expense such a change would entail on the railroad company where that is insignificant as compared with the peril to human life from the maintenance of the bridge in its present condition.[19]

In Illinois the Supreme Court rules that where the neglect charged in the declaration is the failure to ring the bell or sound a whistle at the distance of 80 rods from a crossing, as required by the statute of 1889, an instruction that those in charge of a train "are bound to give reasonable warning, so that a person about to cross with a team and wagon may stop and allow the train to pass, and such warning must be reasonble and timely, so far as the circumstances will reasonably admit," is erroneous, since such instruction imposes on the railroad company a higher degree of diligence than the statute requires, and is broader than the averments of the declaration.[20]

In Kansas the evidence went to show that the view of the track at the crossing was much obstructed, but that before reaching it she stopped and looked and listened, and, discovering no train approaching, she drove toward the track; that just before she reached it a train passed without having blown the whistle or rung the bell, and that plaintiff's mules were frightened, and plunged down an embankment with her, whence resulted the injuries complained of. The Supreme Court holds the railroad liable.[21]

In Illinois the Supreme Court rules that crossing a railroad track on a public highway, where there are a number of side tracks, is not negligence *per se*, though by going a few blocks out of his way the traveler might have crossed the track at a safer place.[22]

[1] Tolman v. Abbot, 47 N. W., 234.
[2] Denver, U. & P. Ry. Co. v. Barsaloux, 25 Pac. Rep., 165.
[3] United States v. Sioux City & St. P. R. Co., 43 Fed. Rep., 617.
[4] Pacific Exp. Co. v. Seibert, 44 Fed. Rep., 310.
[5] Willman v. C. & G. T. R. Co., 47 N. W. Rep., 489.
[6] St. P. M. & M. R. Co. v. Phelps, 11 S. C. Rep. 168.
[7] S. C. & S. F. R. Co. v. Gatewood, 14 S. W. Rep., 913.
[8] Richmond & D. R. Co. v. Benson, 12 S. E. Rep., 357.
[9] Norfolk & W. R. Co. v. Read, 12 S. E. Rep., 395.
[10] Illinois Cent. R. Co. v. Kerr, 8 South. Rep., 330.
[11] L. N. A. & C. R. Co. v. Nitsche, 26 N. E. Rep., 51.
[12] International & G. N. R. Co. v. Smith, 14 S. W., 642.
[13] Alexandria & F. R. Co. v. Herndon, 12 S. E. Rep., 289.
[14] Missouri Pac. Ry. Co. v. Somers, 14 S. W. Rep., 779.
[15] Louisville & N. R. Co. v Orr, 8 South Rep., 360.
[16] Towa v. Michigan Cent. R. Co., 47 N. W. Rep., 665.
[17] Lyttle v. C. & W. M. R. Co., 47 N. W. Rep., 571.
[18] McNally v. Savannah F. & W. Ry. Co., 12 S. E. Rep., 351.
[19] Louisville & N. R. Co. v. Hall, 8 South Rep., 371.
[20] Toledo, St. L. & K. C. R. Co. v. Cline (Ill.), 25 N. E., 846.
[21] Mo. Pac. R. Co. v. Johnson, 24 Pac. Rep., 1116.
[22] C., R. I & P. R. Co. v. Clough, 25 N. E. Rep., 604.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Catawissa, semi-annual, 3½ per cent. on the first and second preferred stocks, payable on demand.

Chicago, Burlington & Quincy, quarterly, 1 per cent., payable June 15.

New Castle & Beaver Valley, extra, 10 per cent., payable May 15.

Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Baltimore & Potomac, annual, Baltimore, Md., June 3.

Belleville & Southern Illinois, annual, Belleville, Ill., June 2.

Boston & New York Air Line, annual, Middletown, Conn., May 2.

Burlington, Cedar Rapids & Northern, annual, Cedar Rapids, Ia., May 26.

Canada Southern, annual, St. Thomas, Ont., June 23.

Chesapeake, Ohio & Southwestern, special, 56 East Court, Memphis, Tenn., June 2.

Chicago, Burlington & Northern, annual, La Crosse Wis., June 10.

Chicago & Eastern Illinois, annual, Chicago, Ill., June 3.

Chicago & Northwestern, annual, Chicago, Ill., June 4.

Chicago, Rock Island & Pacific, annual, Chicago, Ill., June 3.

Chicago, St. Paul, Minneapolis & Omaha, annual, Hudson, Wis., June 6.

Cincinnati, Hamilton & Dayton, annual, Cincinnati, O., June 16.

Concord & Montreal, annual, Concord, N. H., May 26.

Delaware & Bound Brook, annual, Trenton, N. J., May 28.

Denver & Rio Grande, annual, Denver, Col., May 26.

Des Moines & Fort Dodge, annual, Des Moines, Ia., June 4.

Duluth, South Shore & Atlantic, annual, Marquette, Mich., June 4.

Dutchess County, annual, adjourned, 35 Broadway, New York City, May 25.

Florida Central & Peninsula, special, Jacksonville, Fla., June 1.

Green Bay, Winona & St. Paul, annual, Green Bay, Wis., June 3.

Manhattan (Elevated), special, 71 Broadway, New York City, May 27, to consider a proposed increase of the capital stock.

Michigan, Midland & Canada, annual, Detroit, Mich., June 4.

Milwaukee, Lake Shore & Western, annual, Milwaukee, Wis., June 10.

Minneapolis, St. Paul & Sault Ste. Marie, annual, Guaranty Loan Building, Third street and Second avenue south, Minneapolis, Minn., June 2.

Morris & Essex, annual, Hoboken, N. J., June 24.

Northern (New Hampshire), annual, Concord, N. H., May 28.

Ogdensburg & Lake Champlain, annual, Ogdensburg, N. Y., June 17.

Ohio Valley, annual, Henderson, Ky., June 2.

Oregon Improvement Company, annual, Seattle, Wash., June 15.

Oregon Railway & Navigation Company, annual, Portland, Or., June 15.

Portland, Saco & Portsmouth, annual, Kittery, Me., June 1.

Rensselaer & Saratoga, annual, Waterford, N. Y., June 3.

St. Joseph & Grand Island, annual, Elwood, Kan., June 9.

St. Louis, Alton & Terre Haute, annual, St. Louis, Mo., June 1.

St. Paul & Sioux City, annual, St. Paul, Minn., June 6.

Toledo, Canada Southern & Detroit, annual, Detroit, Mich., June 4.

Toledo, St. Louis & Kansas City, annual, Toledo, O., June 10.

Wisconsin Central, annual, Milwaukee, Wis., May 28.

Railroad and Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Association of American Railway Accounting Officers* will hold its annual convention at the Southern Hotel, St. Louis, Mo., May 27, commencing at 10 o'clock a. m.

The *American Institute of Mining Engineers* will hold its next meeting at Cleveland, O., June 2.

The *Master Car Builders' Association* will hold its annual convention at the Stockton Hotel, Cape May, N. J., commencing June 9, at 10 o'clock a. m.

The *American Railway Master Mechanics' Association* will hold its annual convention at the Stockton Hotel, Cape May, N. J., beginning at 9 a. m., June 16. Members wanting rooms reserved are requested to apply to the Secretary.

The *New England Railroad Club* meets at its rooms in the United States Hotel, Beach street, Boston, on the second Wednesday of each month, except June, July and August.

The *Western Railway Club* holds regular meetings on the third Tuesday in each month, except June, July and August, at the rooms of the Central Traffic Association in the Rookery Building, Chicago, at 2 p. m.

The *New York Railroad Club* meets at its rooms, in the Gilsey House, New York City, at 2 p. m., on the third Thursday in each month.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, the fourth Wednesday of January, March, May, September and November.

The *Northwest Railroad Club* meets on the first Saturday of each month, except June, July and August, in the St. Paul Union Station, at 7:30 p. m.

The *Northwestern Track and Bridge Association* meets on the Friday following the second Wednesday of each month at 7:30 p. m. in the directors' room of the St. Paul Union Station, except in the months of July and August.

The *American Society of Civil Engineers* holds its regular meetings on the first and third Wednesday in each month, at the House of the Society, 127 East Twenty-third street New York.

The *Boston Society of Civil Engineers* holds its regular meetings at the American House, Boston, at 7:30 p. m. on the third Wednesday in each month.

The *Western Society of Engineers* holds its regular meetings at 78 La Salle street, Chicago, at 8 p. m., on the first Wednesday in each month.

The *Engineers' Club of St. Louis* holds regular meetings in the club's room, Laclede Building, corner Fourth and Olive streets, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Club of Philadelphia* holds regular meetings at the House of the Club, 1,122 Girard street, Philadelphia, on the first and third Saturday of each month, excepting in January, when the annual meeting is held on the second Saturday of the month. The second January meeting is held on the third Saturday. The club stands adjourned during the months of July, August and September.

The *Engineers' Society of Western Pennsylvania* holds regular meetings on the third Tuesday in each month, at 7:30 p. m., at its rooms in the Thaw Mansion, Fifth street, Pittsburgh, Pa.

The *Engineers' Club of Cincinnati* holds its regular meetings at 8 p. m. on the third Thursday of each month in the rooms of the Literary Club, No. 24 West Fourth street, Cincinnati.

The *Civil Engineers' Club of Cleveland* holds regular meetings on the second Tuesday of each month, at 8 p. m., in the Case Library Building, Cleveland. Semi-monthly meetings are held on the fourth Tuesday of the month.

The *Engineers' Club of Kansas City* meets in Room 200, Baird Building, Kansas City, Mo., on the second Monday in each month.

The *Engineering Association of the South* holds its monthly meetings on the second Thursdays at 8 p. m. The Association headquarters are at Nos. 63 and 64 Baxter Court, Nashville, Tenn.

The *Denver Society of Civil Engineers and Architects* holds regular meetings at 36 Jacobson Block, Denver, on the second and fourth Tuesday of each month, at 8 o'clock p. m., except during June, July and August, when they are held on the second Tuesday only.

The *Civil Engineers' Society of St. Paul* meets at St. Paul, Minn., on the first Monday in each month.

The *Montana Society of Civil Engineers* meets at Helena, Mont., at 7:30 p. m., on the third Saturday in each month.

The *Civil Engineers' Association of Kansas* holds regular meetings at Wichita on the second Wednesday of each month, at 7:30 p. m.

The *American Society of Swedish Engineers* holds meetings at the club house, 250 Union street, Brooklyn, N. Y., and at 347 North Ninth street, Philadelphia, on the first Saturday of each month.

The *Engineers' Club of Minneapolis* meets the first Thursday of each month in the Public Library Building, Minneapolis, Minn.

The *Canadian Society of Civil Engineers* holds regular meetings at its rooms, 112 Mansfield street, Montreal, P. Que., every alternate Thursday except during the months of June, July, August and September.

The *Technical Society of the Pacific Coast* holds regular meetings at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., at 8 p. m. on the first Friday of each month.

American Society of Civil Engineers.

The annual convention of 1891 met yesterday at Lookout Mountain. The following new papers will be presented at the Convention:

"Origin and Evolution of the American Railroad Viaduct," John E. Greiner.

"On the Construction of the Chimney for the Narragansett Electric Lighting Co.," John T. Henthorn.

"Free Railway Construction vs. Government Railways," Edward Bates Dorsey.

"A Trip through the Big Horn Cañon," Edward Gillette, Jr.

"American Irrigation Engineering," H. M. Wilson.

"On the Straits of Juan de Fuca, Puget Sound," W. B. de Courcy.

"Influence of Curvature and Elevation of Track on the Stresses in Bridges," Ward Baldwin.

"Recent Studies into the Biological Changes in the Boston Waters," Desmond Fitz Gerald.

"A Memoir on Water Meters," John Thomson.

"The Hauling Drums of Cable Railways," G. Leverich.

"Mountain Railroad Construction," Wm. Barclay Parsons.

"The Advantages of a Longitudinal Bearing System for Railway Tracks," T. C. Clarke.

"Some Additional Information on the Lake Erie and Ohio River Ship Canal," John M. Goodwin.

"Notes on Cement, Mortars and Concrete," William H. Grant.

It is expected that reports will be presented by the special committees on the "Causes of the Failure of the South Fork Dam," "On Uniform Standard Time," "On Uniform Methods of Testing Materials used in Metallic Structures," "On Standard Rail Sections," "On Impurities of Domestic Water Supply," "On Units of Measurement," and these subjects discussed.

Engineers' Club of Philadelphia.

A regular meeting was held May 2, Vice-President David Townsend in the chair, 17 members and one visitor present. The Secretary presented, for Mr. George R. Ide, a paper descriptive of the Judson pneumatic system for street railroads as operated at Washington, D. C. This system comprises connected, rotating cylinders lying below and between the rails of the track, and in line therewith, which cylinders are operated by compressed-air engines placed at intervals along the line. The cylinders are mounted in bearings in a conduit, and are engaged or clasped by a gripping mechanism suspended from the bottom of the car. The grip comprises two pairs of discs mounted so as to have their axes turned in an approximately horizontal plane to any desired angle with the axis of the underlying cylinder. When the axes of the discs are parallel with the cylinder axis the car will remain stationary, but when turned to any proper angle therewith the car will be moved.

New England Railroad Club.

A regular meeting was held Wednesday evening, May 13, 1891. President Twombly occupied the chair.

It was voted that the meetings of the club be suspended during the months of June, July and August, this year.

Mr. F. D. Adams suggested that it might be desirable to substitute in place of the annual dinner by the members of the club a summer excursion; after some discussion the matter was referred to the Executive Committee by vote of the members present.

Mr. Adams presented the report of the committee appointed at the April meeting to consider the subject of Rules for the Interchange of Cars, and to suggest such changes therein as seemed desirable for presentation to the Arbitration Committee. It was voted that the report be accepted.

A general discussion followed, as reported on another page.

New England Water-Works Association.

The tenth annual convention of this association will be held at Hartford, Conn., June 10, 11 and 12. The headquarters during the convention will be at the Allyn House. The sessions will be at the Putnam Phalanx Hall. At the afternoon session on June 10 a paper on "Sanded flanges for water pipe" will be read by F. C. Coffin, of Boston. At the evening session, beginning at 7:30 p. m., papers will be read on "An experience with a water hammer," and "Are lead-pipe connections for iron service pipe desirable?" At the morning session on Thursday the annual election of officers will take place. Three papers will be read and there will be a topical discussion. At the afternoon session L. A. Taylor, of Boston, will describe the New Haven Water Co.'s dam at Woodbridge, Conn., and Desmond Fitz Gerald, of Boston, will speak on "Dangers likely to arise from building aqueducts in the form of tunnels or with low-grade lines." On Friday a visit will be made to the five reservoirs at West Hartford and Farmington, owned by the Hartford Water Co. R. C. P. Coggeshall, of New Bedford, Mass., is the secretary of the association.

Northwestern Track and Bridge Association.

A meeting of the Northwestern Track and Bridge Association was held in the directors' room of the St Paul Union Depot May 15. The subjects discussed were: (1) Mr. Kindelan's paper on "Track Joints;" (2) "The Best Preservative of Timber" and "Does it Pay to Cover Mem-

bers of Howe Truss Bridges?" introduced by W. A. McGonagle; (3) "The Proper Thing for a Right-Angle Crossing, whether a Framework of Timber or Ties," introduced by Thomas Rafferty.

The Civil Engineers Club of Cleveland.

A regular meeting of the club was held Tuesday evening, May 12, President Gobeille in the chair, and 21 members and three visitors present. Mr. John B. Weddell was elected corresponding member. A vote of thanks was extended to Mr. Aug. Mordecai for his donation to the club of a crayon portrait of Mr. Charles Latimer, deceased, former President of the Club. The Executive Board was instructed to incorporate the Club under the laws of Ohio.

The President appointed Mr. William T. Blunt as member of the Permanent Committee on International Engineering Congress and Engineering Headquarters in connection with the Columbian Exposition of 1893. Mr. James Ritchie read a paper entitled "Recent Advancement in Electric Engineering." The reading was followed by a discussion, in which a number of members participated.

The Technical Conventions.

The Baltimore & Ohio announces that there will be an extra sleeper placed on the B. & O. trains leaving Chicago on Friday, June 5, at 10.10 a. m., and on Saturday, June 5, at 2.55 p. m., kindly tendered by Pullman's Palace Car Co. for the use of the western members of the Master Car Builders' Association who wish to attend the convention at Cape May. The former train will arrive at Philadelphia on Saturday, at 3.22 p. m., and the latter at 8.15 p. m. on Sunday. Any further information concerning the running of the trains can be obtained from Mr. E. W. Grieves, Master Car Builder of the B. & O., Camden Station, Baltimore.

PERSONAL.

—Mr. Thomas McGill, General Western Agent of the Central of Georgia, died last week at Indianapolis from injuries received in a wreck near Mount Jackson April 27.

—Mr. John C. Loomis, formerly Division Superintendent of the Louisville & Nashville, has succeeded Mr. J. R. Sears as Manager of the Louisville Car Service Association.

—Mr. Cornelius Vanderbilt, Chairman of the Board of Directors of the New York Central, sailed from New York, last Saturday, to spend the summer months abroad. Mr. H. Walter Webb, Third Vice-President of the road, sailed on the "Majestic," Wednesday, to be absent a month.

—Mr. W. W. Stearns, Superintendent of the Eastern Division of the New York, Lake Erie & Western, resigned last week. Mr. Stearns has been Division Superintendent of the Erie for several years, and previously held similar positions on the Central of New Jersey and the Philadelphia & Reading.

—Mr. Charles G. Ellis, President of the Schenectady Locomotive Works, died at his home in Schenectady, May 15, aged 48 years. He had been troubled considerably of late with rheumatism, though it was not considered serious. He was about the works as usual until Wednesday evening, when he went home not feeling well. Pneumonia set in and developed rapidly, causing death in a few hours.

—Mr. C. M. Bissell, who has been Division Superintendent of the New York Central road for several years, has resigned as Superintendent of the Mohawk Division, and has been succeeded by Mr. Frank A. Harrington, late Assistant Superintendent. Mr. Bissell has been Superintendent of the Mohawk Division since last October, when the Hudson and Mohawk divisions were divided. He had previously been Superintendent of both divisions. He was for many years a conductor on the New York Central, and was first appointed Superintendent early in the seventies.

—Mr. R. H. Soule has been appointed Superintendent of Motive Power of the Norfolk & Western, succeeding Mr. S. B. Haupt, who recently resigned. Mr. Soule has been with the Union Switch and Signal Co. since November, 1888. Before that time he was for some time General Manager of the Erie, to which road he went from the Pennsylvania, where most of his earlier railroad experience was obtained. It is not necessary to say to the readers of the *Railroad Gazette* that the Norfolk & Western is most fortunate in securing Mr. Soule's services. He takes up the duties June 1.

—The death of Mr. Samuel M. Cummings, one of the old-time railroad men, was briefly noticed last week. He died in Boston, March 6, after years of great suffering. A lifelong friend of Mr. Cummings sends us some account of his last years. Mr. Cummings had been blind for the last four years. Notwithstanding this affliction and his other sufferings, his mind retained its clearness and strength to the last. Some of his old friends frequently went to visit him, when he would always brighten up and talk with all his old-time vigor about engines, railroads and railroad men and friends. His interest in railroad mechanical affairs was keen to the last. Mr. Cummings' history is mainly in the machinery department. His first railroad work was as an engine runner on the Old Colony, then employed in the Hinckley Locomotive Works; Master Mechanic of the Old Colony long ago; Master Mechanic of the Michigan Southern; afterward on the eastern division of the Pittsburgh, Fort Wayne & Chicago, and last Master Mechanic of the eastern division of the same road for about 16 years. As a Master Mechanic he kept abreast of the times, was conscientiously honest to his employer and strictly just to men employed under his direction, both in the shops and on the road. He was generous and kindly in all his dealings.

ELECTIONS AND APPOINTMENTS.

Adirondack & St. Lawrence.—The officers of the company are: W. Seward Webb, President, 51 East Fifty-fourth street, New York City; W. N. Roberts, Chief Engineer, and E. M. Burns, General Manager, Herkimer, N. Y.

Atchison, Topeka & Santa Fe.—The freight and passenger departments of the Colorado agency have been separated. C. F. Zimmermann is now General Agent for the freight department; J. P. Hall, Colorado passenger agent, is in charge for the passenger department, both with offices in Denver.

Atlantic & Western of Florida.—The control of this road has been recently transferred to the Palatka Lumber Co. and W. J. Winegar. The following officers have been elected: T. A. Darby, President, and W. J. Winegar, of Palatka, Fla., Treasurer, and F. C. Austin, General Manager.

Buffalo, Rochester & Pittsburgh.—The Board of Directors of the company has appointed W. J. Reilly Purchasing Agent, his appointment to take effect June 1. He has been secretary to the vice-president.

Butte, Anaconda & Pacific.—The incorporators are: William L. Hoge, Stephen H. Estes, Shelley Tuttle, William M. Thornton and Judson B. Losee, all of Anaconda, Mont.

Carolina Midland.—The following directors of the consolidated company have been elected: George A. Wagener, Charleston, S. C., A. J. S. Perry, H. G. Bremer, D. H. Salley and Simon Brown. Mr. Wagener is President, H. R. Walker, Secretary, and M. Brown, Barnwell, S. C., Treasurer.

Chicago, Burlington & Quincy.—The annual meeting of the stockholders of the company was held in Chicago, May 20. There were 448,468 shares of stock represented out of a total of 763,926 shares. The following directors were re-elected: John M. Forbes, Charles J. Paine, John I. Gardner, Francis W. Hunnewell, William Endicott, Jr., Richard Olney, T. Jefferson Coolidge, Edward W. Hooper, John N. A. Griswold, Peter Geddes and Charles E. Perkins.

Cincinnati, Wabash & Michigan.—W. R. Baldwin has been appointed General Passenger and Ticket Agent, vice E. H. Beckley, resigned. Mr. Baldwin will also have charge of the baggage department, with headquarters at Elkhart, Ind.

Cleveland & Canton.—The stockholders of the company held their annual meeting at Canton, O., May 13. The old board of directors was re-elected, as follows: H. A. Blood, George N. Smalley, Boston; William J. Rotch, New Bedford, Mass.; F. W. Hopkins, New York; A. C. Barstow, Jr., Providence; William Edwards, E. S. Flint, E. S. Emery, S. T. Payne, Henry C. Ramsey, Cleveland; Isaac H. Taylor, Carrollton, Ill.; H. S. Belden, Canton; I. N. Pennock, Minerva.

Cleveland, Cincinnati, Chicago & St. Louis.—C. V. Lewis has been appointed Assistant General Freight Agent, with office at Cincinnati. He will issue all tariffs, divisions and percentages, and have charge of the freight claim department.

Cleveland, Lorain & Wheeling.—The annual meeting of the road was held last week when the following directors were elected: E. R. Perkins, Worthy S. Streator, Oscar Townsend, and C. L. Cutter, Cleveland; John Newell, Chicago; E. B. Thomas and A. S. Gorham, New York. The only changes are the election of E. B. Thomas, Vice-President of the Erie, to succeed H. A. Kent, and the election of A. S. Gorham to fill the vacancy caused by the death of Selah Chamberlain.

Concord & Montreal.—G. E. Cummings has been appointed Assistant Superintendent of the road north of Concord, N. H.

Concord & Rochester.—The following are the incorporators of this road: Isaac A. Hill, T. C. Bethune, Warren Tripp, Charles H. Daniells, Smith W. Caswell, Frank H. Hall, G. W. Lane, Charles C. Shaw, Charles Lake, George M. Munsey, Charles A. Langmaid, Albion C. Caswell, C. H. Trickey, William D. Sawyer, A. E. Cotton, Granville P. Conn, J. E. Smith, John J. Cate, Charles P. Foye, J. C. Locke, J. W. Jewell, Scott W. Caswell, D. S. Woodman, J. E. Waldron, C. S. Whitehouse, J. B. Tennant, William E. Whitehouse, C. Hill, C. W. Hanson and Horace K. Emery. The office of the company is at Concord, N. H.

Dayton, Lebanon & Cincinnati.—The company was incorporated in Ohio in April. Its organization was completed at a meeting at Dayton, O., May 11, when the following officers were elected: S. J. Patterson, President; Samuel Hunt, of Cincinnati, Vice-President and Secretary; G. B. Harmon, Treasurer, and G. W. Warrington, General Counsel. The executive committee is as follows: George W. Houk, H. A. Talbott, Wm. Irwin and W. P. Callahan.

Detroit, Lansing & Northern.—The annual meeting was held in Detroit, May 14. The following directors were elected: N. Thayer, H. H. Hunnewell, J. B. Burnham, George O. Shattuck, C. L. Young, George Whitney, A. H. Hardy, Charles Merriam, C. F. Adams, E. V. R. Thayer and Charles M. Heald.

Eastern Railroad Association.—At the twenty-fourth annual meeting of the Association held in New York on May 13, the following officers were elected for the ensuing year: Hon. William D. Bishop, President; Theodore N. Ely, Vice-President; Albert A. Folsom, Treasurer; Robert J. Fisher, General Counsel, and John J. Harrower, Secretary. The Secretary has been in the employ of the Association ever since its organization.

Erie Terminal—The stockholders of the company are: Col. S. B. Dick, Meadville, Pa., President; John E. Reynolds, John Dick, A. F. Heveline, W. G. Sargent, A. C. Huidekoper, Meadville, and E. S. Templeton.

Georgia.—At the annual meeting in Augusta, Ga., May 13, the following directors were elected: President, Chas. H. Phinizy; Directors, Stevens Thomas, George Hillyer, W. M. Reese, Joel A. Billups, H. D. McDaniel, H. H. Hickman, N. L. Hutchins, J. H. Alexander, D. N. Speer, A. W. Calhoun, T. W. Coskery, Leonard Phinizy, W. E. McCoy, Jas. White, R. D. Spalding and Jacob Phinizy. There was only one change in the board, Boykin Wright retiring and Jacob Phinizy taking his place.

Illinois Central.—F. L. Drake, Commercial Agent of the road at Atlanta, has been appointed Assistant General Freight Agent, with headquarters at Memphis, vice A. J. Knapp, resigned.

Lake Shore & Michigan Southern.—L. M. Hynika, who has been Assistant Civil Engineer at Dunkirk, N. Y., has been promoted to the position of Engineer, to fill the vacancy caused by the resignation of Arthur Rockwood.

Lehigh & Western.—The company has been chartered in Pennsylvania by the following directors: Rudolph T. McCabe, New York City, President; George L. Sanderson and C. La Rue, Munson and Williamsport, Pa.; Samuel H. Hicks, Thomas W. Barlow and Charles C. Lister, Philadelphia; E. N. Frisbie, Passaic, N. J., and Benjamin S. Harmon, New York City.

Mantane.—The annual meeting of this company was held last week at Sandy Bay, Gaspe, when the following were elected: Dr. Fiset, President; L. F. Pinault, Vice-President; A. Tessier, A. F. Carrier, Thomas le Bel, L. N. Desrosiers and L. J. le Vasseur, directors. J. A. Marquis was appointed Secretary and Treasurer of the company.

Mason City & Fort Dodge.—At the annual meeting on Tuesday last the old directors were re-elected, as follows: J. J. Hill, D. C. Shipperd, W. A. Stephens, E. P. Hickey and H. Brown.

Mount Washington.—At the annual meeting of the company, May 13, the following directors were elected: Walter Aiken, James T. Furber, J. R. Pearson, Nathaniel White, Jr., Fred Smythe, John P. George, George A. Fernald. The board organized by the choice of Walter Aiken as President, F. E. Brown, Clerk.

New Boston (N. H.).—At a meeting of the directors of the road on May 11, an organization was perfected by the election of the following: President, G. A. Wason; Clerk, E. H. Wason; Treasurer, J. F. Webster; Executive Committee, B. A. Kimball, J. H. Pearson, C. A. Busiel.

Newport News & Mississippi Valley Co.—W. E. Moore has been appointed Assistant Superintendent of the company's road, with office at Paducah, Ky. The office of Master of Transportation has been abolished.

New York & Harlem.—The annual meeting, held in New York City, May 19, resulted in the election of the following Directors: Cornelius Vanderbilt, W. K. Vanderbilt, Frederick W. Vanderbilt, Samuel F. Barger, Chauncey M. Depew, Charles C. Clarke, John B. Dutcher, John E. Burrill, W. H. Leonard, F. P. Freeman, Samuel D. Babcock, A. Van Santvoord and Robert Schell.

New York Central & Hudson River.—The following appointments took effect May 20: J. H. Phyfe to be Superintendent of the Harlem Division, vice C. L. Rossiter transferred to be Assistant Superintendent of the Western Division to succeed Mr. W. C. McCulloch, resigned. Mr. Phyfe has been Assistant Superintendent of the Hudson River Division for many years. Mr. Frank A. Harrington, who has been Assistant Superintendent of the Mohawk Division, has been appointed Superintendent of that division, to succeed C. M. Bissell, resigned.

Omaha, Kansas Central & Galveston.—The following is a complete list of the officers of this company: Jacob Neuberger, 111 Broadway, New York, President; C. M. Rawlings, Vice-President and General Manager, Lyons, Kan.; D. M. Bell, Treasurer, Lyons, Kan.; Valdemar Sillo, 330 East Fifty-first street, New York, Secretary; Edward Roemer, 177 East Ninety-third street, New York, Chief Engineer; J. B. Yates, Assistant Chief Engineer, Lyons, Kan.; J. W. Andrews, Principal Assistant Engineer; F. W. Truesdell, Superintendent Right of Way Department, Lyons; and Samuel Jones, General Solicitor, Lyons. The general offices are at Lyons.

Pittsburgh, Fort Wayne & Chicago.—At the annual meeting of the road, May 20, John Sherman, S. B. Harrison and George B. Roberts, whose terms as directors had expired, were re-elected.

Plymouth & Bourne.—The annual meeting of the company was held recently. The following Board of Directors was elected: W. A. Nye, G. I. Briggs and B. B. Abbe, Bourne, Mass.; Nathaniel Morton, of Plymouth, Mass.; G. T. McLaughlin, of Sandwich, Mass.; C. C. Doten, C. J. Litchfield, G. R. Briggs and W. T. Davis, of Plymouth, Mass. At a subsequent meeting of the directors, W. A. Nye was elected President; Nathaniel Morton, Vice-President and Treasurer, and C. C. Doten, Clerk.

Rome, Watertown & Ogdensburg.—The following appointments were announced by General Manager Bowen on May 20: Theodore Voorhees to be General Superintendent, in charge of the transportation department; William Buchanan to be Superintendent of Motive Power and Rolling Stock; I. H. McEwen to be Superintendent, with headquarters at Oswego, N. Y.; H. W. Hammond to be Assistant Superintendent, in charge of the Eastern Division, including the lines east and north of Watertown, with office at Watertown, N. Y.; W. S. Jones to be Assistant Superintendent, in charge of the Western Division, including all the lines south and west of Watertown, with office at Oswego, N. Y. The road has heretofore been operated in three divisions. Mr. McEwen has been Assistant Superintendent of the Western Division; Mr. Jones, Assistant Superintendent of the Middle and Eastern Divisions, and Mr. Hammond, Assistant Superintendent of the Eastern Division.

St. Louis Merchants' Bridge Co.—The third annual meeting of the company was held at St. Louis last week, and these directors were elected: Seth W. Cobb, C. C. Rainwater, Charles D. McClure, Gov. D. R. Francis, Charles Clark, A. B. Ewing, G. H. Goddard, B. F. Hobart and D. W. Caruth. The only new members are Mr. McClure, who takes the place of John R. Holmes, and Mr. Caruth, who suceeds L. C. Nelson.

Salt Lake, Colorado & Gulf.—The incorporators are: Horace Brightman, Erastus F. Mead, Austin Stevens, W. Hanna, Chauncey W. Blackmer and David H. Lemmon. The office of the company is at Cortez, Col.

Sioux City, Madison & Northern.—The company has been organized by F. C. Hills, T. P. Gere and C. L. Wright, of the Sioux City & Northern, and others. The officers chosen are as follows: President, Charles B. Kennedy, of Madison, S. D.; Vice-President, T. P. Gere, of Sioux City, Ia.; Secretary, Craig L. Wright, of Sioux City; Treasurer, J. A. Cooley, of Dell Rapids, S. D.

Sioux City & Northern.—The annual meeting was, held in Sioux City, Ia., May 14 F. C. Hills, Sioux City, was elected President and General Manager; James E. Booge, Vice-President; A. S. Garretson, Treasurer, and D. S. Elliott, Secretary.

Southwestern (Georgia).—John S. Baxter, of Macon, Ga., has been elected President to fill the vacancy made by the death of Col. John E. Jones. Capt. W. W. Gordon, of Savannah, has been elected a director.

Spokane & Southern.—Arthur A. Newberry, Spokane, Wash., F. Lewis Clark, J. M. Kinnaird, Jonathan G. Clark, of Bangor, Maine, and Ormond G. Smith, of New York, are the incorporators of this Washington road.

Tintic Range.—The following were named as directors in the charter filed in Utah last week: David C. Dodge, A. E. Welby, William F. Colton, George Goss and Robert Harkness. The stockholders are as follows: D. C. Dodge, trustee, 650 shares; and Robert Harkness, D. C. Dodge, Theron Geddes, A. E. Welby, P. C. Fenelly, Thomas Mannereaux, E. A. Greenwood, W. F. Colton and George Goss,

Valley (Montana).—The officers of the company are: Richard A. Harlow, Montana Bank Building, Helena, President; Robert S. Hill, Vice-President; P. De F. Rust, Secretary and Treasurer. Directors, Richard A. Harlow, Robert S. Hill, P. De F. Rust, C. K. Cole and J. D. Wilson. The Chief Engineer is W. A. Haven.

Winona Terminal.—The incorporators are R. D. Cone, Charles Horton, Andrew Hamilton, W. H. Laird, H. W. Lamberton, J. L. Norton, Venazana Simpson, Thomas Simpson, and E. L. Youmans, all of Winona, Minn.

RAILROAD CONSTRUCTION.
Incorporations, Surveys, Etc.

Adirondack & St. Lawrence.—The following is given officially as the route of this road: It will extend from Herkimer, N. Y., through the Adirondacks, by the Old Forge House, Big Moose Lake, Brandreth Lake, the Two Tupper Lakes, Saranac Lake, Paul Smith's, Loon Lake and Malone, to Valleyfield, with a branch into Lake Placid, and a branch into Racquet Lake and Blue Mountain Lake. The contracts for grading and tracklaying have been let to J. W. Westbrook & Co., of New York City, and Ellsworth, Chapman & Lathrop, of Corning, N. Y. About 3,000 men are now at work, and 10 miles of track has been laid. The character of the work is medium. The maximum grade is 70 ft. to the mile, and maximum curves are eight degrees. There are no tunnels and no important trestles, but about 12 or 15 iron bridges will be necessary.

Alberta.—The bill to amend the acts relating to the Alberta Railway & Coal Co., introduced in the Dominion Parliament, provides for the ratification of the agreement by which the company purchased the property of the Northwestern Coal & Navigation Co., sanctions the issuance of first mortgage debentures to the amount of £890,000, and asks for leave to extend the road through Crow's Nest Pass to a point in British Columbia where connection can be made with the Canadian Pacific.

Alleghany & Kinzua.—The company has recently begun grading on a few short branches in McKean County, Pa. Besides this work surveys are being made for about 15 miles of new road. One branch will be built from Sugar Run Junction southwest into a tract of hemlock timber, and another line will be built up the main Kinzua Creek from Dunkle to Mead Run, a distance of about four miles.

Arkansas Midland.—The proposed consolidation of this road and the Brinkley, Helena & Indian Bay is expected to be effected shortly. The necessyry arrangements have been nearly completed. The gauge of the latter road will be changed, and the 35-lb. iron rails will be replaced with steel. Many improvements are also to be made on the present line of the Arkansas Midland, and about 1,000 tons of 56-lb. rails have been purchased to be delivered next month. The consolidation of the two roads will give a line from Helena to Brinkley, Ark., about 70 miles long. The Brinkley, Helena & Indian Bay connects with the Arkansas Midland at Pine City, and extends north to Brinkley. The six-mile branch from Pine City south is to be extended about 10 miles to Indian Bay, and when the extension is finished the line between Clarendon and Indian Bay will be operated as a separate division.

Baltimore & Ohio.—The right of way for the proposed branch to Georgetown is being condemned by the county officers of Montgomery County, Md. The line is to extend from Linden, near Rockville, on the Metropolitan branch, southeast to the Potomac River, above Georgetown. The branch will be about 10 miles long.

Bloomsburg & Sullivan.—An extension is proposed from Jamison City, the northern terminus, north a distance of about 15 miles, to a point near Ganoga Lake in Luzerne County, Pa. The location has not yet been made, but the line will probably be ready for grading during the summer.

Brantford, Waterloo & Lake Erie.—This road, extending from Waterford to Brantford, Ont., 16 miles, connecting with the Michigan Central at Waterford, was some time ago purchased by J. N. Young & Co., of Chicago, who have since operated it. Young & Co. are the projectors of the Toronto, Hamilton & Buffalo, which was to be connected with the Brantford road at Hamilton. The proposed road has not been built, and, on account of the failure of Young & Co. to comply with the purchase agreement, the directors have re-taken possession of the above road and its rolling stock.

Buffalo & Geneva.—It is reported that a survey is being made for a branch of this road about 10 miles long, to begin at a point in Yates County, N. Y., on the main line now being built from Geneva, and to extend north to Rochester.

Burlington & Missouri River.—Press dispatches of last week have stated that Kilpatrick Bros. & Collins, of Beatrice, Neb., will resume work immediately on the extension of the branch built last year through Wyoming from Newcastle. The construction is to begin near Merino, and it is proposed to complete the first 30 miles from that point northwest toward Buffalo, Wy., to Belle Fourche during the summer. This line is being built largely to reach the cattle ranches in the northwest part of the State. The same firm of contractors is also to build a branch to Hot Springs, S. D., leaving the Deadwood line at Bradley. It will be about 12 miles long.

Butte, Anaconda & Pacific.—The organization of this company was practically completed at Anaconda, Mont., May 15. It is proposed to build a line about 25 miles long from Butte west to Anaconda. The charter will probably be filed in a few days. The route is described as from Butte down Silver Bow Creek to the head of Deer Lodge Valley, and skirting the foothills to Anaconda; thence up Spring Creek to the divide, near the source of Flint Creek, southwesterly to the east fork of Rock Creek to the Bitter Root River, and following the Skalkaho Creek, to the Bitter Root River, and thence to Missoula.

Calgary & Edmonton.—The rails have been laid from the Red Deer River, 93 miles north of Calgary, to Blind Man. The last-named stream is now being bridged, and the graders are pushing the work some miles beyond to Edmonton, Alberta, the northern terminus of the road, 97 miles beyond the Red Deer River.

Camden & Alexandria.—The track will probably be laid and trains running on this road between Camden and El Dorado, Ark., early in June. The distance between these points is 21 miles, and the grading has been finished for several months. All the track has been laid except on the last few miles near El Dorado. The construction work would have been finished in January but for several unforeseen delays. The grading was finished last year.

Canadian Pacific.—This company has a bill before the Dominion Parliament asking for new powers to lease roads. There are acts of Parliament authorizing the owners of subsidiary lines to sell to the Canadian Pacific, but, notwithstanding this, the latter company cannot buy unless a special act be passed permitting it to make the purchase. The company therefore asks for a general act empowering it to buy a road which Parliament has said may be sold to it. Last session a measure was brought in asking for powers to acquire lines anywhere without any distinct authority. This bill was not passed. Application is also made by the company for power to sell surplus lands and to devote the proceeds to the purchase of rolling stock.

Carolina Midland.—This company has been formed by the consolidation of the Blackville, Alston & Newberry and the Barnwell road. The articles of incorporation were filed in South Carolina last week. The capital stock is $540,600. The consolidated road extends from Barnwell northwest to Seivern, S. C., a distance of 40 miles. An extension is to be built from the latter town to connect with the Richmond & Danville at Batesburg. The Southern Investment Co., of Charleston, S. C., was recently organized to build various other extensions, including one from Barnwell southwest to Allendale, S.C., 17 miles, upon which the grading is in progress. The contractors are J. Macklen & Co., Hayes Bros., and Griffith Lionberger, of Barnwell, S. C.

Charleston, Cincinnati & Chicago.—Respecting the statement made last week concerning the line of this road between Rutherfordton and Marion, N. C., an officer writes that the extension was completed in December last, before the appointment of the receiver, and has since been in operation. The length of the line is 25 miles, and the following are the stations: Camps, Whisnant, Union Lumber Co., Golden Valley, Weavers, Neilsville, Garden's and Marion.

Charleston, Clendenin & Sutton.—Sixty-four of the leading business men of Charleston, W. Va., have formed a company under the above name, and have applied for a charter for a road to extend from Charleston up the Elk River Valley to Sutton, Baxter County, connecting with the West Virginia & Pittsburgh. A mass meeting was held at Charleston last Saturday night at which $200,000 was subscribed to the capital stock of the company. The capital stock under the charter is $500,000 and the principal office is to be at Charleston.

Chattanooga Southern.—The tunnel on this line through Pigeon Mountain near Chattanooga was completed May 16. The tunnel is over 1,600 ft. long and the work has been in progress for nearly two years. The track will be laid through it immediately and trains will be running over the entire line from Chattanooga to Gadsden, Ala., a distance of 90 miles, early in June.

Chicago & New Orleans.—The contract of Francis M. Ferguson, of Evansville, Ind., referred to last week, is for the grading, bridging and tracklaying between the Ohio River and Farina, Ill., where connection is made with the Illinois Central. The distance is about 130 miles. Mr. Ferguson is the sub-contractor under the Central Improvement Co., whose office is at No. 226 La Salle street, Chicago, C. P. Moore, of Farina, is the Chief Engineer of the company.

Chicago, Rock Island & Pacific.—Dispatches from Omaha state that the Rock Island and the Chicago, Milwaukee & St. Paul have decided upon a location for a joint bridge across the Missouri River to be located near the boundary line between Omaha and South Omaha. It is stated that nothing will be done toward building until after the decision of the United States Supreme Court in the suit of the Rock Island against the Union Pacific, but that the bridge will be built whichever way the decision may be. It is also stated that the Rock Island has transferred to the St. Paul a half interest in a $200,000 tract of land in South Omaha, including station grounds and right of way to the river.

Clarendon, Oklahoma & St. Louis.—The surveys will begin shortly for this road through the northwestern section of Texas. The line begins at Clarendon, on the Union Pacific, Denver & Gulf, and will extend easterly to the mouth of the Elm Fork of the Red River at the east line of Texas in Collingsworth County, and thence a little to the north of east to a point in Oklahoma. The route is through a level country and there will be very little grading. The maximum grade is 56 ft. per mile, with maximum curves of four degrees. James H. Parks, of Clarendon, Tex., is Chief Engineer.

Cleveland Belt & Terminal.—The company was incorporated in Ohio last week to build a belt line around Cleveland, O., for passenger and freight traffic. The route of the proposed line is as follows: "Beginning at a point on the Cleveland & Canton in Cleveland, between the stations of Newburg and Broadway, thence northerly, crossing the New York, Pennsylvania & Ohio and the Cleveland & Pittsburgh to the New York, Chicago & St. Louis tracks near Willson avenue, which is to be one of the termini; also from the first-named point northerly along the Cleveland & Canton to a point 1,200 ft. southeast of the Cuyahoga River at Independence street, and thence northwest to Lake Erie, near Rocky River, in Rockport, which is to be another terminus, and also from the Cleveland & Canton road through the townships of Newburg, Warrensville, East Cleveland and Euclid, to a connection with the Lake Shore & Michigan Southern at Collinwood, the third terminus." The incorporators of the company are J. W. Cassingham, Albert Rakusek, M. C. Barber, H. R. Moore and E. T. Blood. The old belt line was capitalized at $500,000 and the capital stock of the new company will be over $1,000,000. The work of construction is in progress.

Concord & Rochester.—The organization of this road was completed at a meeting in Concord, N. H., May 16. An amended charter for the road was recently granted by the New Hampshire legislature. The survey will be begun immediately by F. W. Conn, of Concord. The road is to extend from Concord northwesterly through the towns of Chichester, Epsom, Northwood and Barrington to the city of Rochester, or to a point on the Nashua & Rochester division of the Boston & Maine in Barrington. The distance is about 40 miles.

Coos Bay, Roseburg & Eastern.—A mortgage for $2,500,000 has been recently placed on this road, which is now being built between Roseburg and Coos Bay, on the Pacific coast. The mortgage is to secure an issue of six per cent. 30-year bonds, of which the Farmers' Loan and Trust Co., of New York City, is the trustee. The bonds are issued on a basis of $25,000 per mile. It is reported that the entire issue has been sold in London.

Delaware Terminal.—The bill granting a special charter to this company has passed both branches of the state legislature. The route is not very clearly defined in the charter; it is to be from a point on the Philadelphia, Wilmington & Baltimore near Lewes, in Sussex County, northwest to a point on the Maryland state line in Newcastle County.

Eastern Central.—This company, having a capital stock of $100,000, was incorporated in Ohio May 20. It a consolidation of the Logansport & Chicago, which proposes to build a road beginning at Galion and ending in Indiana, and the Eastern Central, beginning at Galion and ending near the village of Oxford, Holmes County. The incorporators are H. C. Carhart, Wilson Armstrong, Jacob Riblet, A. C. Squire, F. A. Keen and W. Stillwell.

Erie Terminal.—A charter was granted at Harrisbugh, Pa., May 18, to this company, which is to build a road from a point in the city of Erie, Pa., to a connection with the Pittsburgh, Shenango & Lake Erie near Girard Junction, Erie County. The length of the road will be 15 miles. The capital stock is $150,000.

Florida.—Bills were introduced in the Legislature last week to incorporate the Lakeland, Mohawk & Tavares and the Chipola & Chippewa Lake roads; also to extend the time for the completion of the Alabama, Florida & Atlanta.

Glasgow.—It is reported that this road has been recently sold to an English and Eastern syndicate for $150,000. It extends from Glasgow Junction to Glasgow, Ky., about 10 miles and is still operated by the Louisville & Nashville, though the lease expired in 1881 and has not been renewed.

Grand Rapids & Grayling.—This company filed articles of incorporation in Michigan, May 15, to build the proposed road between Grand Rapids, Grayling and Alpena, mentioned last week under New Roads. The capital stock is $1,000,000. The names of the incorporators were published in our last issue.

Grand Trunk.—This company has introduced a bill in the Dominion Parliament authorizing the construction of the line from Glencoe north to a point on the Sarnia branch at or near Kingscourt, Ont., near Watford. This branch is the proposed cut-off to the St. Clair Tunnel to relieve the main line.

Great Northern.—Burns & Chapman, of Spokane, Wash., are letting the balance of the sub-contracts on the section of the Pacific extension west of the Kootenay River to Chateroy, Wash. The contract of the firm is for the grading on 180 miles, and they expect to have 50 miles completed by Aug. 1, and the entire section early in November. Already about 35 miles of the right-of-way has been cleared. About 500 men are employed altogether.

Great Northwest Central.—It is understood that Contractor Charlebois and the officers of the company have reached a basis of settlement in the dispute concerning the completed portion of the road between Brandon, Ont., and Oak River, 50 miles. As soon as the questions are settled the company will begin the operation of the road as far as built and may also decide to begin the construction this year on the further extension.

Harriman Coal & Iron.—The East Tennessee Land Co., which is building this belt road at Harriman, Tenn., has completed the tracklaying this year on about one mile of new road from the end of track to stone quarries at the crossing of the Waldens Ridge Division of the East Tennessee, Virginia & Georgia. Work has been commenced on the Brushy Mountain Division, which is to extend from De Armond station, in Roane County, on the East Tennessee, Virginia & Georgia, to the Brushy Mountain coal fields. The line is about 12 miles long and is being built by William Kenefick & Co., of St. Louis.

Hearne & Brazos Valley.—The survey for this road is being made by N. J. Williams, of Wanesburg, Mo. Preliminary lines will be run from Hearne, Tex., west about 10 miles, and thence along the Brazos Valley. The clearing of the right of way to the Brazos River will probably be commenced in a few days.

Kansas City, Rich Hill & Eldorado.—This road was sold under execution by the Sheriff at Nevada, Mo., May 16, to satisfy judgments. The road was bought by Attorney Irvin Jordan, representing those who hold judgments. It is understood the deed will be made to Judge H. Tillotson, representing the First National Bank of Nevada, which will pay off the indebtedness and probably complete the road. Some grading has been done between Nevada and Eldorado.

Kewaunee, Green Bay & Western.—McIntosh Bros., of Milwaukee, Wis., were awarded the contract last week for the grading on this road to Green Bay, Wis. The road will be about 25 miles long, and will begin at Kewaunee, Wis., and extend westerly through the peninsula south of Sturgeon Bay to the town of Green Bay. W. J. Abrams, of Green Bay, is President.

Lancaster, Oxford & Southern —The articles of incorporation for the Maryland Division of the road were filed with the Secretary of Maryland this week. The capital stock is $200,000. The charter is for the road from Oxford to Singerly, on the Philadelphia Division of the Baltimore & Ohio road.

Lehigh & Western.—The charter of this company was filed in Pennsylvania last week. The company proposes to build a road from a point near White Haven, in Luzerne county, Pa., to a point near Berwick, Columbia county, Pa. The length of road is to be 35 miles. The capital stock is $1,000,000. R. T. McCabe, New York City, is President.

Little Falls & Dolgeville.—A copy of a mortgage in favor of the Metropolitan Trust Co. of New York has been recorded in the County Clerk's office at Herkimer, N. Y. The mortgage is given to secure first mortgage bonds amounting to $250,000, and it covers all the road between Little Falls and Dolgeville, N. Y.

Long Island.—About 16 miles of second track is being constructed this year on the eastern lines of this road. About ten miles will be built on the Montauk Division between Pearsalls and Massapequa, N. Y. The balance is on the main line between Mineola and Hicksville. C. L. Rehill, of Jersey City, has the contract for the work.

Maine Shore Line.—At elections held in Washington County, Maine, this week, the proposition to aid this road by guaranteeing its bonds was carried. The county commissioners are authorized to guarantee the interest upon $650,000 of the first-mortgage bonds of the company, at five per cent. for 35 years. The plans proposed provide for lines to start from the Maine Central at Hancock, the arm of the sea being bridged across to Sullivan, and continuing along the shore to South Charlotte, where the line will divide, one branch going to Eastport and the other to Calais.

Manistique & Northwestern.—This company, whose incorporation in Michigan was noted last week, proposes to build a road from Manistique to Negaunee and Ishpeming. The incorporators are H. Duval, W. D. Hall, J. D. Mersean, G. H. Orr and Martin H. Quick, of Manistique, Mich.; R. M. Cherrie, of Chicago, and A. Watson, of Painted Post, N. Y. The capital stock is $1,000,000.

Mantane.—The officers of this company state that the surveys for the road will soon be commenced. The line is to extend from Mantane to Metis, a distance of about 30 miles. The company has a subsidy from the local government of 10,000 acres of land per mile, and has applied for aid from the Dominion administration also.

Mexican International.—It is announced in the Mexican papers that the company proposes to begin work at once on the extension to Durango, and that large contracts for crossties for the extension have been recently let. The surveys of the line were made a year ago and the location approved by the Department of Public Works of Mexico. The extension will be from the southern terminus of the road at Torreon south to Durango, about 100 miles.

Mexican Roads.—The Department of Public Works of Mexico has granted a concession to Delfin Sanchez & Co. for a road between Izúcar de Matamoras and Acapulco. The concession carries with it the obligation to build a branch from a point between the stations of Ayotla and La Compañía through Riofrío, to connect with the line between San Martin Texmelúcan and Puebla. Surveys must begin at once and construction within ten months. The government guarantees a net profit of seven per cent. on the cost of the line and its equipment for 35 years, the amount specified to be devoted to the payment of interest and the liquidation of mortgage bonds. When the road earns over seven per cent. net the excess is to be equally divided between the government and the company.

Mexican Valley.—This company has been incorporated at Des Moines, Iowa, with a capital of $1,000,000, to build and maintain railroads in the Valley of Mexico. The Mexican Federal District road has also been incorporated in the same city with a capital of $1,000,000, to build railroads in the Federal District of Mexico.

Missouri Pacific.—The track on the Plattsmouth cut-off was laid to within five miles of Plattsmouth, Neb., May 16, and the officers expect to complete the tracklaying this week. The branch extends from Union north through Murray to the Missouri River at Plattsmouth.

Monterey & Mexican Gulf.—The tracklaying south of Victoria on the last section to Tampico will probably be finally completed by Aug. 1. At the first of the month about 40 miles of road remained to be finished and the material for the entire distance has been delivered. The road is over 320 miles long, from Monterey to Tampico. The formal opening of the line will occur Sept. 16.

Montreal & Atlantic.—The bill to incorporate the bondholders of the Southeastern Railroad under this name has passed its second reading in the Dominion Parliament. The act provides that the new company may acquire the present line of the Southeastern, which is operated by the Canadian Pacific; that the capital stock shall be $3,200,000, equal to the unpaid principal and interest of the company's bonds; that the bondholders shall in due course be classed as shareholders of the new company.

Mount Moosilauke.—The survey has just been completed for this road, which it is proposed to build to the summit of Mt. Moosilauke. The road begins at Warren, N. H., on the Concord & Montreal, and will be 20 miles long. The line up Mt. Moosilauke will be a cog-wheel road. The mountain is about 4,815 feet high to its summit. F. W. Conn, of Concord, is the Chief Engineer.

Newport & Shermans Valley.—About seven miles of track has been laid on this road this year on the extension from Bloomfield Junction to Loysville, Pa. The line is being extended still further southwest of Loysville to Blain, Pa., a distance of 10 miles. Samuel H. Gring, of Reading, Pa., has the contract for building the extension. The terminus of the road is to be at a point about four miles southwest of New Germantown and about 16 miles beyond Loysville.

New York & New England.—A bill is now before the Massachusetts legislature authorizing the company to build the extension of its Providence & Springneld division into Massachusetts, to connect with the New York & New England in the town of Douglas, near the intersection of the boundary lines of Massachusetts, Connecticut and Rhode Island.

New York, New Haven & Hartford.—The four-tracking of the road is now being done between Bridgeport, Conn., and Southport. About 200 men are working near the Mill Plain crossing, where the tracks have been elevated about 10 ft. Two new tracks have been laid from Fairfield west to Lockwood's The bridge, which will span the tracks at the Fairfield station, will be the largest between Bridgeport and Norwalk. Southport will have two stations, one for east-bound and one for west-bound trains.

North Mexican Pacific.—A. M. Tenney, of Colonia Diaz, Mex., has taken the contract for the grading of this line from a point nine miles south of Palomas, Mex., to Corralitos, a distance of 90 miles.

Oaxaca Coa'.—The concession granted to Jose Arco for the construction of this line has been signed by the Department of Public Works of Mexico. The line is to be standard gauge and is to extend from Puebla and pass through Huajuapam to the Rio Verde River, where it is navigable to the Pacific Ocean, with the right to build branches to coal and iron beds in the State of Oaxaca. In each two years at least 100 kilometres of line must be built. A subsidy of $8,000 per kilometre is given, payable in six per cent. subvention bonds.

Omaha, Kansas Central & Galveston.—Previous articles in these columns have kept our readers posted as to the progress made with this project. The company was incorporated last fall to build a road, as stated in the charter, from the north line of Kansas to Galveston. During the winter and spring preliminary surveys have been completed through Kansas and the Oklahoma territory, from Lyons, Kan. The engineers have made the surveys, profiles, maps and estimates, and they report a that the line will be very easy to construct. The General Manager writes that the route in Kansas passes through the following towns and counties: Lovewell and Randall, in Jewell County; Beloit and Saltville, in Mitchell County; Barnard and Lincoln Center, in Lincoln; Ellsworth, in Ellsworth; Frederick, Lyons and Alden, in Rice; Plevna, in Reno; Laredo and Rochester, in Kingman; Attica and Ruella, in Harper; thence to the Cherokee Outlet, directly south of Ruella, and southeasterly across the strip, crossing the Rock Island road at the north line of Oklahoma territory. The line continues due south to Frisco, to Oklahoma City, and parallel to the Santa Fe road to Lexington, opposite Purcell, and along the South Canadian River in the Pottawatomie Reservation; easterly to the crossing of the South Canadian River to the Chickasaw nation's lands, southerly to the Stonewall coal region and south eight miles east of Tishimingo and thence nearly directly south to Denison, Tex. From this point the route is to be to Greenville, Kaufman, Fairfield, Buffalo, Madisonville, Thorpe's Mill and Houston to Galveston. From the South Canadian River the line runs alternately through forests and prairies. Statistics prepared by the company show that the tier of counties in Kansas through which this road is projected is the most productive in the state both for corn, wheat and other cereals, the line going through the centre of the wheat belt. The engineers report Oklahoma to be a very productive country, with the appearance of having been settled 20 years instead of a little over two. Farm houses and surroundings are about as good on the average as those in Kansas, and the territory was thickly settled along the survey. The headquarters of the company are at Lyons, in the salt belt of Kansas. It is contemplated to commence the construction of the road from Kansas south in June.

Pacific Short Line.—The foreclosure sale of this road under the decree of the United States District Court in Nebraska has been announced as to take place this month. The division to be sold under the decree is the line now in operation from South Sioux City to O'Neill, Neb., 130 miles.

Peninsula Railway & Navigation Co.—This company, which last fall began the construction of a road four miles long between Allyn and Bergen, Wash., on Hood's Canal, will probably resume work very soon. Two miles of the road is graded. Its object is to divert Hood's Canal business to Tacoma via the Tacoma-Allyn line of steamers. The road is to extend from Allyn to Union City, Wash., 16 miles.

Philadelphia Market Street Elevated. — The Mayor of the city of Philadelphia has advertised for proposals for building an elevated railroad in that city. The contract provides for a double-track structure in the middle of Market street, from the Delaware River to Juniper street, on Juniper street to South Penn Square, on South Penn square to Broad street, on Broad street to Market street, and in the middle of Market street to Sixty-third street, the route being in a direct line on Market street and skirting half of the City Hall on Penn Square. Before any bid will be received a bond for $500,000 must be filed for the faithful performance of the work, and the accepted bidder must file bonds aggregating $2,075,000. The bids close at the office of the Mayor of Philadelphia on June 16, 1891.

Philadelphia & Reading Terminal.—A contract has been executed with J. J. Ryan & Co., of Philadelphia, for the masonry of the road extending from Cherry street, between Eleventh and Twelfth streets, northward to Ninth street and Fairmount avenue, and including the branch line from Callowhill street east of Twelfth street to Broad and Noble streets. Messrs. Ryan & Co.'s bid was accepted in the award made a short time since for the work between Eleventh and Twelfth streets, from Carlton to Callowhill, and thence to Ninth street and Fairmount avenue on the main line, and the Pennsylvania branch from Twelfth and Callowhill to Broad and Noble streets. The rest of the work was awarded to Samuel Hart & Son, but they declined to accept the terms of the contract, and hence a new contract was entered into with Ryan & Co., covering all the masonry work northward from Cherry street.

Philadelphia & Seashore.—The negotiations, which have been pending for several weeks between the directors of the company and several railroad contractors, have resulted in an agreement whereby Hobart & Howe, of New York City, will undertake the completion of the unfinished lines to Sea Isle City and Cape May, N. J. Work will be commenced this week on the Sea Isle line from Tuckahoe, which it is agreed shall be completed in July. President Morris Boney states that the necessary legal steps will at once be taken looking to a consolidation of the two companies, and that as soon as this is perfected a large force of men will be placed on the Cape May line.

Pittsburgh, Washington & Southern.—Thomas M. Jackson, Chief Engineer of this road, and John L. Johnson with a corps of engineers have begun new surveys for the road from Mannington, Marion County, W. Va., via Blacksville, to the Kanawha Valley. They will soon put two more engineering corps on the route and propose to have these surveys completed by July.

Pittsburgh & Western.—At present there is about 10 miles of double-track on the main line between Allegheny and Newcastle Junction, Pa., a distance of 57 miles. Five miles of this is on the Elwood branch and five miles between Downeyville and Newcastle. It is stated that the company proposes to complete this year a large portion of the second track between Allegheny and Newcastle, and that a large force will be put on the work in a few weeks. Part of the proceeds of the $2,000,000 of bonds recently just authorized are to be devoted to this work.

Port Reading.—Work on this extension on the Philadelphia & Reading from Bound Brook to the Arthur Kill is now well under way and progressing satisfactorily. The first 10 miles of the road, from Bound Brook, N. J., eastward, is under contract to Nolan Brothers, of Reading, Pa. Two miles of grading has already been completed, and the abutments and some of the piers of the bridge crossing the Raritan River are finished. It is expected that the entire masonry work of that structure will be completed by June 1. A. J. McBean has the contract for the construction of the last nine miles of the road and the terminals at Port Reading. He has been kept back somewhat by the delay in securing the right of way for the line, but he has now begun operations on his division. The line will probably be in operation by January 1 next. W. Hunter, Assistant Chief Engineer of the Philadelphia & Reading, has charge of the work.

Rio Grande Southern.—The tracklaying on the line south of Telluride commenced about 10 days ago at Vance Junction, Col., on the main line, near the junction of the branch which extends east to Telluride. About 100 men are at work at present south of Vance Junction, formerly called Ilium, but it is proposed to largely increase this force in a few weeks. The track is to be laid to Rico immediately. Some work may also be done on the southern division between Rico and Durango. The work to be done this year will be easy. The maximum grade will not exceed two per cent., and the maximum curves will be 10 degrees.

Rio Grande Western.—H. T. Reynolds, of Springfield, Utah, who has the contract for the narrow-gauge extension through the Sevier Valley, has the road completed and the track laid on the first 15 miles south of Manti, the present terminus of the branch. Ground has been broken as far south as Salina, and the grading is in progress on nearly all the sections between the two towns. The track will probably be laid to Salina early in July.

St. Louis, Cape Girardeau & Fort Smith.—This company was organized at Cape Girardeau, Mo., May 16. It is a reorganization of the Cape Girardeau Southwestern, which is at present in operation between Cape Girardeau, on the Missouri River, and Hunter, Mo., 94 miles. It is proposed to extend the road from Hunter southwest to Northern Arkansas and thence towards Fort Smith. The survey was begun last week. The capital stock is $7,000,000, that of the old company being $2,500,000.

Salt Lake, Colorado & Gulf.—The company was incorporated in Colorado last week. The capital stock is $100,000. The line of road to be built extends from Fort Wingate, N. M., to Cortez, in the Montezuma Valley of Colorado, thence to Salt Lake City. Branches are to be built to Rico and Durango, Col., and to Bluff City, Utah. The principal office is at Cortez, Col.

Sioux City, Madison & Northern—The company was incorporated in South Dakota last week, to build a road from Garretson's, S. D., through Dell Rapids and Madison to Minot, N. D. This is the route projected for the extension of the Sioux City & Northern from its present terminus at Garretson's, and the incorporators are directors of the latter company. The survey for the new line is to be made this summer by E. D. Vincent, of Sioux City.

Spokane & Southern.—The company has been formed to build a road in Washington, Idaho and Oregon. The main line will run from Spokane south, to a point on the Snake River. The capital stock is $1,000,000.

Suburban Rapid Transit.—Considerable work has been done within the last few weeks on the extension of this elevated road above its present terminus at One Hundred and Seventieth Street, New York City. The structure is now erected up to about One Hundred and Seventy-fourth Street, and it is hoped to have it completed as far as Tremont by July 1. When the work now under way is completed, to Tremont, the line may be extended about a mile further north to Fordham. Connection has been practically completed between the elevated structure and the New York, New Haven & Hartford road, and by June 1 it is expected that rapid-transit trains will be run from One Hundred and Twenty-ninth Street to New Rochelle.

Temiscouata.—This company is applying to the Dominion Parliament for the subsidy allotted to them of $2,000,000, $10,000 a mile for 200 miles of the extension of the road to Moncton, N. B. It is reported that an agreement with the Grand Trunk to lease and operate the road has been practically closed.

Tintic Range.—Articles of incorporation of this branch road were filed in Utah, May 11. The capital stock is $1,625,000, and the line is to be 65 miles long, extending from a point on the Rio Grande Western between Provo and Spanish Forks in a general southwesterly direction to Goshen, thence across the East Tintic Mountains, westerly, via Homansville Pass, and to the Tintic mining district in Juab County, to near Eureka, and thence to Mammoth Hollow, with branches to mines. Of the capital stock $975,000 is preferred and $650,000 is common stock. The road is to be a branch of the Rio Grande Western.

Trenton Cut-off.—The last rails connecting the sections of the Pennsylvania Cut-off Road between the Schuylkill and Delaware Rivers were laid a few days ago. Two forces of men were at work on the road, one working west from Morrisville and the other going east from the long bridge over the Schuylkill below Norristown. The connection was made near Hatboro, Bucks county. A single track now extends from one river to the other, crossing both Montgomery and Bucks counties in a line almost straight. An additional track has been laid part way, and work on it will be completed at once. The material used in its construction is being transported over the track now laid. All the bridges have been constructed for two tracks, while many of the excavations have been made wide enough for four tracks. The company expects to have trains running over the road from Morrisville to Glen Lock some time in the coming fall.

Valley (Montana).—John Brady, of Helena, Mont., was recently awarded the contract for the grading on this road from Helena northeasterly to the Missouri River across the Prickly Pear Valley. The length is 17 miles. The line is definitely located and railroad building was to have begun May 18. The contract for the tracklaying will be let within a month. The grading to be done is mostly earth work with some loose rock. The maximum grade is two per cent. and the maximum curves are eight degrees. No bonds will be issued for this section of the road, sufficient stock having been subscribed by business men of Helena to complete the road to the Missouri River. The officers of the company believe that the road may prove to be quite important in the near future, as some of the greatest deposits of carbonate ore that have ever been discovered are being developed at the new mining camp of Castle, 75 miles from the northern terminus. It is said by mining men that this camp will prove to be a second Leadville, and it is important to the business interests of Helena that communication be established between that point and the city. The names of the officers are given in another column.

Vanegas, Rio Verde & Cedral.—It is proposed to extend this line to Tula de Tamaulipas, Mex., a place of considerable importance not now connected with railroads. The region to be traversed by the extension is well populated and fertile.

West Virginia & Pittsburgh.—A corps of engineers under Major William Harry and W. W. Joliffe left Braxton C. H., W. Va., last week for the mouth of Williams River, where they begin the survey of the line of the proposed extension from Braxton, C. H., to Covington, Va. Another engineering corps is working from the southern end of the line.

Winona Terminal.—The company was incorporated in Minnesota, May 11, with a capital stock of $500,000,

Its object is to acquire and operate terminal facilities for railroads and build connecting tracks, steamboat docks and warehouses in Winona. The following are the officers: William H. Laird, President; R. D. Cone, Vice-President; H. M. Lamberton, Secretary and Treasurer.

Winnipeg & Hudson's Bay.—President Southerland has been at Ottawa for the last ten days negotiating with Mr. Mackenzie, representing Ross, Mann & Holt, contractors, for a settlement of the disputes in reference to the Hudson's Bay road. An agreement for the withdrawal of all legal proceedings on both sides has been arrived at, and hereafter Mr. Southerland will have the co-operation and support of the firm of contractors. It is understood that a similar settlement has been made with the West Cumberland Steel Co. of England. The Dominion Government has promised that it will prepare a bill ratifying the subsidy of $80,000 a year for 20 years, for which an Order-in-Council has been passed. Mr. Southerland leaves for England in a few days with a view of completing financial arrangements for the construction of the road.

GENERAL RAILROAD NEWS.

Atchison, Topeka & Santa Fe.—The gross earnings, operating expenses (exclusive of taxes and rentals) and net earnings of the road and its auxiliary lines for March were as follows:

	Gross earn.	Oper. expen.	Net earn.	Oper. mileage.
Roads owned and controlled	$2,422,604	$1,701,560	$721,044	6,527
Roads jointly owned, Atchison's one-half	151,214	145,276	5,938	587
Total Atchison system.	$2,573,818	$1,846,836	$726,982	7,114
St. Louis & San Francisco:				
Roads owned and controlled	$505,347	$340,655	$164,692	1,329
Roads jointly owned with Atchison, 'Frisco Company's one-half	148,746	142,065	6,681	536
Total 'Frisco system...	$654,093	$482,720	$171,373	1,865
Aggregate both systems.	3 227,910	2,329,556	898,354	8,979

The following is the comparative statement of all lines:

	Gross earnings.	Net earnings.	Gross earnings.	Net earnings.	Mileage
Atchison system:					
Mar., 1891.	$2.573,818	$726.982	$361.78	$102.19	7,114
Mar., 1800.	2,625,142	871,760	369.21	122.61	7,110
In. or dec.	D. $51,324	D $144,778	D. $7.43	D. $20.42	I. 4.18
'Frisco system:					
Mar., 1891.	$654,093	$171.373	$350.68	$91.88	1,865.22
Mar., 1890.	619.465	231,338	333.88	125.77	1,855.37
In. or dec.	I. $34.618	D. $61,965	I. $.6 80	D. $33.89	I. 9.85
Aggregated general system:					
Mar., 1891.	$3,227,911	$898,355	$359 46	$100.04	8,979.63
Mar., 1890.	3,244,607	1,105 098	361.90	123.26	8,965.60
In. or dec.	D. $16.696	D. $206,743	D. $2.44	D. $23.22	I. 14.03

Baltimore & Ohio.—The monthly report shows the earnings and expenses for April, 1891, compared with April, 1890, to be as follows: Earnings, 1890, $1,994,482; 1891, $1,892,089, a decrease of $102,393; expenses, 1890, $1,436,787; 1891, $1,303,562, a decrease of $133,225; net earnings, 1890, $558,695, and 1891, $588,027, an increase of $29,332. Earnings and expenses for the seven months of the fiscal year 1890-91 compared with the same months of the fiscal year 1889-90: Earnings, 1890, $13,975,086, and 1891, $13,600,098, a decrease of $374,988; expenses, 1890, $9,690.366, and 1891, $9,656,717, a decrease of $33,649; net earnings, 1890, $4,284,720, and 1891, $3,043,381, a decrease of $241,339.

Canadian Pacific.—The company will cease operating the line between Farnham and St. Lambert, Que., in June, and it is said that the Montreal, Portland & Boston, which now owns the line, will operate it.

Chicago, Peoria & St. Louis.—The Secretary of State of Illinois has recorded the consolidation of the Chicago, Peoria & St. Louis and the St. Louis & Northern, under the name of the first-mentioned corporation. The capital stock of the consolidated company is $3,500,000, and the principal office is at Jacksonville. The first board of directors is: Issac L. Morrison, William S. Hook, L. Marcus Hook and Francis Hook, of Jacksonville, Ill., and William T. Barbee, of Lafayette, Ind. The road is part of the Jacksonville Southeastern Line. The St. Louis & Northern was recently incorporated.

Lockport & Buffalo.—The long pending contest between this road and the Erie Company, over the payment of an existing indebtedness of about $44,000, has been compromised. The former company has accepted the terms of the Erie, which agrees to pay half of the indebtedness, or $22,000, and the half-yearly rental due on April 1, amounting to $4,550.

London & Port Stanley.—The city of London, Ont., is petitioning the Dominion Parliament for power to sell this road. The city holds about $650,000 of bonds in the road and no interest or principal has been paid. It therefore asks to be allowed to sell its interest. The road extends from London to Port Stanley, Ont., 24 miles, and is operated by the Grand Trunk.

New York Central & Hudson River.—The following statement of the earning and operating expenses has been issued:

Three months to March 31:

	1891.	1890.	Inc. or dec
Gross earnings.....	$8,988,176	$8,573,780	I. $414.395
Oper. expen	5,975,439	5,718.159	I. 257,280
P. c. expen to earn....	66.5	66.7	.....
Net earnings	$3,012,737	$2,855,621	I. $157,115
Fixed charges.....	2,184,850	1,965,420	I. 219,430
Profit.....	$827,887	$890,201	D. 62,315
Dividend.....	894,283	894,283	.....
Deficiency.....	$66,396	$4.082	I. 62,315

Nine months to March 31:

	1891.	1890.	Inc. or dec.
Gross earnings.....	$27,514,866	$27,180,234	D. $335,368
Oper. expenses.....	18,498,942	18,310,689	I. 188,254
P. c. expen. to earn...	67.2	65.7	.....
Net earnings.....	$9,015,923	$9,539,545	D. $523,621
Fixed charges.....	6,381,250	5,909,121	I. 472,129
Profit.....	$2,634,673	$3,630,424	D. $995,751
Dividend	2,682,849	3,129,990	I. 447,141
Surplus (deficit).....	$48,176	$500,434	I. $548,610

The operations of the Rome, Watertown & Ogdensburg are included since March 15, 1891.

Pacific of Missouri.—It is announced that the Missouri Pacific has decided to extend at five per cent., until July 1, 1988, the $2,573,000 second mortgage gold bonds of this road, which mature on July 1 next. The present security and lien will remain in full force. The company has made arrangements with Vermilye & Co., of New York, on behalf of a syndicate, to purchase the bonds at par at maturity and to extend the same on their account.

St. Louis Southwestern.—The receivers of the property of the St. Louis, Arkansas & Texas Co. in Arkansas and Missouri, by direction of the United States District Circuit Courts of Missouri, Arkansas and Louisiana, transferred the possession of all the property on May 18 to the reorganized company. The lines in Texas have been reorganized as the St. Louis Southwestern of Texas.

Tyler Southwestern.—The receivers of the property of the Kansas & Gulf Short Line Railroad, by direction of the United States District Circuit Courts of Texas transferred the possession of all the property of the company to the above company on May 18.

Union Pacific.—The officers and directors of the road engaged in considering the proposed issue of new bonds have decided to issue about $10,000,000 at once. The bonds will be collateral trust with a mortgage clause, and will bear five per cent interest. As yet it is uncertain as to whether they will be offered to the stockholders. In any event, they will be underwritten by a private syndicate, and if not offered to the stockholders will be bought outright by the syndicate. It is stated that the net floating debt of the company which it is proposed to fund with these bonds amounts to about $8,000,000.

The following statement gives the earnings of the entire system and of the Oregon Shore Line & Utah Northern for March and the first quarter of the year:

TOTAL UNION PACIFIC SYSTEM.

Month of March.	1891.	1890.	Inc. or dec
Mileage.....	8,144	8,042	I. 102
Gross earnings.....	$3,272,986	$3.658,300	D. $385,314
Oper. expenses.....	2,257,171	2,531,821	D. 274,650
Net earn.....	$1,015,815	$1,126,479	D. $110,664
Since Jan. 1.			
Gross earnings.....	$9,167,386	$8,957,109	I. $210,277
Oper. expenses.....	6,464,554	6,800,761	D. 336,207
Net earn.....	$2,702,832	$2,156,348	I. $546,484

OREGON SHORT LINE & UTAH NORTHERN.

Month of March.	1891.	1890.	Inc. or dec.
Mileage.....	1,422	1,399	I. 23
Gross earnings.....	$616,610	$646,269	D. $29,659
Oper. expenses.....	387,146	434,573	D. 47,427
Net earn.....	$229,464	$211,695	I. $17,768
Since Jan. 1.			
Gross earnings.....	$1.793,914	$1,380,322	I. $413,592
Oper. expenses.....	1,081.425	1,095.270	D. 13,845
Net earn.....	$712,489	$285,052	I. $427.437

Zanesville, Mount Vernon & Marion.—The Mercantile Trust Co., of New York, trustee of this road, has brought suit at Zanesville, O., to foreclose its mortgage for $225,000 on account of the default in payment of interest.

TRAFFIC.

Chicago Traffic Matters.

CHICAGO, May 20, 1891.

Considerable speculation is being indulged in as to just how effective the so-called "boycott" against the Alton is proving. Friends of the Alton continue to assert that with the probable exception of the Pennsylvania and New York Central the other lines are in fact not enforcing their instructions to agents to carry out the orders of the Board of Rulings. Some of the western lines are likely to get restless if they are satisfied that this is the case, as it will directly affect them, while aiding instead of hindering the Alton in the carrying out of its policy.

The order restoring rates from St. Louis to Kansas City and from St. Louis to Chicago went into effect at midnight May 16. The Wabash, Burlington, Atchison and Illinois Central advanced their rates in compliance with the orders of the Chairman of the Western Passenger Association, but the Alton did not. A complaint against the Alton has been made with a request to be allowed to meet the unauthorized rates of that road. This has been granted, and the rates will go back to the figures in effect prior to May 16. Chairman Finley can now fine the Alton for violation of the association agreement, in which case that road will probably take an appeal to arbitration, on the ground that the action of the Chairman in restoring rates was not authorized by the agreement.

A conference was held May 15 between the railroads and the live stock, dressed beef and provision shippers at which resolutions were adopted that the division of dressed meats and live stock shipments by the co-operative action of the carriers is practicable and desirable as best calculated to secure stable, uniform and reasonable rates. It appears, though, that the action was not unanimous, and another meeting has been called for May 25 by the committee of packers appointed at that meeting.

The Central Traffic Association has adopted the usual resolution in regard to the carriage of exhibits to and from the World's Columbian Exposition at half rates, but with a proviso that a release be given by owners limiting the liability of carriers to one-half of the ordinary responsibility attached to the transportation of the same freight. Horses and other valuable animals are to be charged tariff rates in both directions.

The Central Traffic Association lines have voted that they will not in any way tolerate or encourage the so-called harvest or home-seekers' excursions, on the ground that they subserve no public good and render unstable established rates.

The Western Passenger Association has decided to make summer tourist rates on the basis of 80 per cent. of the combined locals. The Alton objected to the proposition to make the St. Louis and St. Paul rates on a basis of 75 per cent. while making the rates between other points more, but voted for the 80 per cent. basis.

The first carload of California cherries for the Chicago market arrived last week, coming over the Union Pacific-Northwestern line.

The joint committee of the Trunk Line and Central Traffic Associations have agreed that a clause shall be printed upon all tariffs issued in joint territory as follows:

Under this tariff when freight is to be loaded by consignor or unloaded by consignee, $1 per car per day or fraction thereof for delay beyond 48 hours in loading or unloading will be added to the rates named herein and constitute a part of the total charges to be collected by the carrier on the property; except, however, when in conflict with rules of Car Service Associations at destination, in which case the car service regulations shall prevail.

Traffic Notes.

It is reported that some of the Canadian roads have been altering freight classifications, involving of course changes in rates, without the approval of the Governor in Council, which the law requires.

Negotiations are being had between the Trunk lines and the Canadian Pacific which it is hoped will lead to getting the latter road into the clearing house for the division of emigrants at New York City.

The Pacific Fast Fruit Line has been organized by men connected with the Atchison, Topeka & Santa Fe at Topeka, Kan. The specific business of the company apparently is to furnish refrigerator cars to the Atchison road.

The Norfolk & Western has revised its passenger tariff, and will put a new schedule into effect on June 1. First-class fare is reduced from 3½ to 3 cents per mile; second-class from 3 to 2.7 cents; a reduction of 14 per cent. in first-class fare and 10 per cent. in second class.

The New York Central and the Erie have apparently adopted a policy similar to that of the Lehigh Valley in carrying grain from Buffalo to New York City at very low rates in order to take it away from the canal boats. It is said that several million bushels of wheat are being carried at about 9 cents per 100 pounds.

The roads between Chicago and St. Paul, whose passenger traffic is now reported to a committee for equalization, have adopted, as one mode of diverting traffic, the plan of agreeing upon one or two lines to take certain classes of excursion traffic which ordinarily would be divided among all the lines. The political conference that met in Cincinnati May 19 was told by the Chairman of the Western States Passenger Association that half-fare rates would be granted between St. Paul and Chicago by only one road, the Chicago, Burlington & Northern.

The Inter-State Commerce Commission has, in an opinion by Chairman Cooley, announced its decision in the case of Beaver & Co., manufacturers of soap at Dayton, Ohio, against the Pittsburg, Cincinnati & St. Louis and sixteen other roads, in favor of the complainant. The points decided are briefly as follows: Where two kinds of soap are made use of for the same purposes and are advertised and held out to the world as suited for like purposes and are substantially equal in value, they should both, for the purposes of transportation and rating, be placed in the same classification. Where two soaps are represented as suitable for laundry and also for toilet purposes, and both are used for those purposes, it would be unjust discrimination to place one of them in a classification as toilet soap and the other in a much lower classification as laundry soap.

The fruit handlers belonging to the Philadelphia Produce Exchange have, under advice of counsel, determined to unite to demand redress of certain grievances against the railroads bringing fruit from the South. They have resolved to pay no lump freight bills; to require bills to bear shippers' name and itemized freight charges; to refuse to pay a higher rate of freight than that named in the bill of lading; to protest against the diversion of freight to any other route than that selected by the shipper and to claim damages for any loss resulting therefrom; to demand payment of damages for losses caused by delay or improper handling; to render bills at selling price for shortages in shipments, allowing no discount, and to appoint a committee to consider all agreements and an inspector to visit transportation depots and docks and represent the exchange. The chief grievance of the fruit handlers at present is that the Pennsylvania, on account of competition with the Clyde Line, unloads Norfolk freight first instead of unloading trains in order as they come in.

Interstate Commerce Commission.

Interstate Commerce Commissioners Morrison, Bragg, Veazey and Knapp are making a circuit to the Pacific Coast and return, and will hear cases and make investigations at various points on the route. They will be at the following places, and probably for the time set opposite to each:

St. Paul, May 21 and 22; Fargo, N. D., May 23; Spokane Falls, Wash., May 26 to 30; Tacoma, May 31 to June 3; Portland, June 4 to 5; San Francisco, June 7 to June 9; Salt Lake City and Denver, about June 11 and 13; Topeka, June 16; Kansas City, June 17 and 18; Chicago, June 20.

The First Shall be the Last and the Last First.

The Mayor and Council of Leavenworth, Kan., having complained to the State Railroad Commissioners about the train service on the Leavenworth, Topeka & Southwestern branch of the Union Pacific, the Commissioners have decided that the one mixed train which runs each way daily ought to run from Topeka to Leavenworth in the morning and return in the evening, instead of running toward Topeka in the morning and toward Leavenworth in the evening. The ground taken by the Commissioners is that Leavenworth is the natural trading point for people living on this line, and that the road was built for the purpose of enabling them to conveniently reach that city.

East-Bound Shipments.

The shipments of east-bound freight from Chicago by all the lines for the week ending Saturday, May 16, amounted to 49,611 tons, against 55,508 tons during the preceding week, a decrease of 5,897 tons, and against 62,892 tons during the corresponding week of 1890, a decrease of 13,281 tons. The proportions carried by each road were:

	Wk. to May 16.		Wk. to May 9.	
	Tons.	P. c.	Tons.	P. c.
Michigan Central.....	7,929	16.0	8,419	15.1
Wabash.....	2,574	5.2	3,907	7.1
Lake Shore & Michigan South.	6,085	12.3	7 692	13.9
Pitts., Ft. Wayne & Chicago...	6,290	12.7	6,121	11.0
Chicago, St. Louis & Pitts.. ...	8,141	16.4	6,552	11.8
Baltimore & Ohio	2,878	5.8	2,978	5.4
Chicago & Grand Trunk.....	4,267	8.6	5,831	10.5
New York, Chic. & St. Louis...	6,158	12.4	7,956	14.3
Chicago & Atlantic.....	5.280	10.6	6,052	10.9
Totals.....	49,611	100.0	55,508	100.0

Of the above shipments 1,764 tons were flour, 19,141 tons grain, 4,219 tons cured meats, 810 tons lard, 7,031 tons dressed beef, 1,346 tons butter, 1,400 tons hides, 309 tons wool and 7,698 tons lumber. The three Vanderbilt lines together carried 40.7 per cent., while the two Pennsylvania lines carried but 29.1 per cent.